PIT AND QUARRY

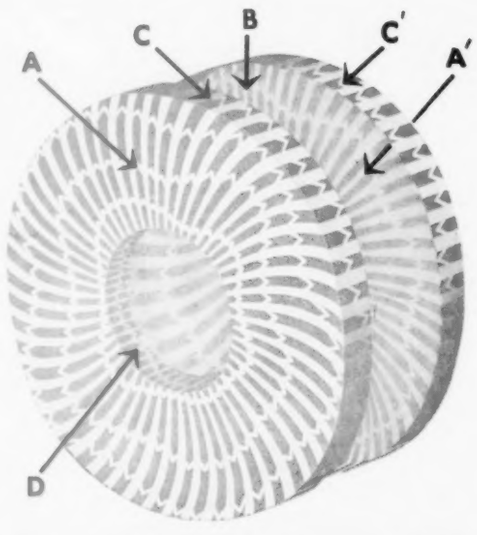
1934
GEOLOGICAL DIVISION

MAY, 1938

Lime, Gypsum and Magnesite from Sea Water and Shells . . . Rowe White and the Seven Mental Giants . . . Concrete Joists—a Profitable Product

ONE OF THE 25 INSTALLATIONS

within a Half Hour's Drive fro one City in the United State



Diagrammatic Illustration of Hydrosealing Principle

Clear Water Film A and A' entirely fills the annular clearance between both Pump Side Plates and Impeller (which rotates in space B) and flows over the edges C and C' entirely around the periphery of the Impeller; also into the eye of the Impeller, entirely around the periphery of the Pump Suction D.

If you'd like to know the name of this city and the names and address of these installations write us. Many of these Hydroseal Pumps replac pumps of conventional design after actual performance records prov that they saved ⅓ or more in power costs. The animated diagram at t left shows how hydrosealing cuts power and maintenance costs. A fi of clear water prevents abrasive material from rapidly wearing and e larging the clearance between the Impeller and Pump Side Plates, a in addition, these Side Plates are Maximix Rubber Lined for long life and easy, inexpensive replacement. Send for Catalog No. 93

HYDROSEAL MAXIMIX RUBBER PROTECTED DREDGE PUMP

HYDROSEAL AND MAXIMIX DESIGNS ARE COVERED BY PATENTS AND APPLICATIONS IN THE MAJOR MINING CENTERS OF THE WORLD AND CAN BE PURCHASED ONLY THROUGH THESE COMPA

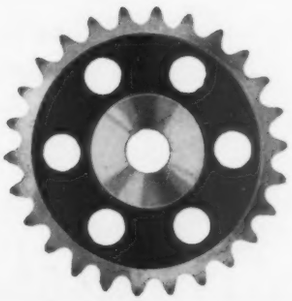
U. S. A.: THE ALLEN-SHERMAN-HOFF CO. 221 S. 15th St., Philadelphia, Pa.
CANADA: ALLEN-SHERMAN-HOFF, LTD. 602 Colonial Bldg., 11 King St., West, Toronto, Ont.
ENGLAND: THE ASH CO. (LONDON), LTD. 79/80 Petty France, Westminster, S.W. 1, London
PHILIPPINE ISLANDS: ATKINS, KROLL & CO. Insular Life Bldg., Manila
SOUTH AFRICA: THE DENVER MACHINERY CO., LTD., 206 Commissioner St., Johannesburg
AUSTRALIA: CROSSLE & DUFF PTY., LTD., 360 Collins Street, Melbourne

PRINT I

LINK-BELT *Quality* IN EVERY LINK

Chains of PROMAL–MALLEABLE–STEEL

● Use genuine Link-Belt chains and sprockets for conveyors and drives in every kind of service. The Link-Belt line is complete. Stocks carried by our plants, warehouses, and jobbers. Send for General Catalog No. 700.



LINK-BELT COMPANY

The Leading Manufacturer of Equipment for Handling Materials and Transmitting Power

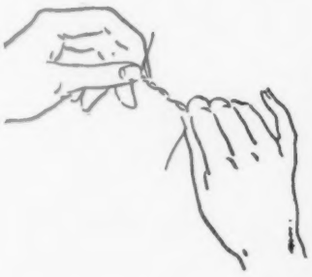
INDIANAPOLIS CHICAGO PHILADELPHIA
SAN FRANCISCO ATLANTA TORONTO
Offices in Principal Cities

7302-D

PIT AND QUARRY, May, 1938. Vol. 30, No. 11. Published monthly by the Complete Service Publishing Company, 538 South Clark Street, Chicago, Ill. Subscription price $1 for 1 year in the U. S. and possessions, Canada and Central So uth America; elsewhere $1 additional for each year. Single copies 20 cents. Entered as second-class matter February 28, 1932, at the Post-Office at Chicago, Ill., under the Act of March 3, 1897. Additional entry at Milwaukee, Wis.

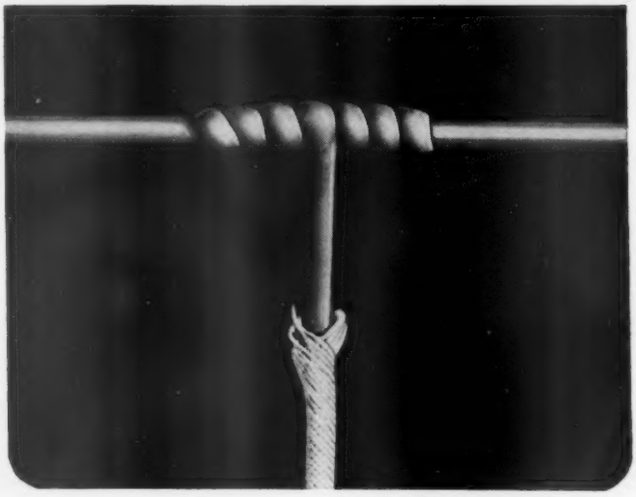
PRINT IN BINDING

Taking the Switch at 3 miles a second

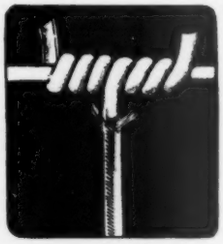


EASY as twisting a wire . . . the split ends of Cordeau-Bickford Detonating Fuse can be wrapped around the main line without the slightest trouble. The end of each branch line is slit back about four inches with the Cordeau slitter and opened up in the form of a V. The main line is pressed *firmly* against the TNT in the fork, and the slit ends are wound *tightly* about it.

These connections, when made with reasonable care, will carry the lightning-swift detonating wave of Cordeau—traveling 17,500 feet per second—directly into each bore hole and into each cartridge.



THE ENSIGN-BICKFORD COMPANY
CB72 SIMSBURY, CONN.



CORDEAU·BICKFORD *Detonating Fuse*

SWING MUSIC FOR MR. ROCHO!

Read this true performance story —

TELEPHONE 601

CABLE ADDRESS "DREDGE"

BAY CITY SHOVELS, INC.

CONVERTIBLE POWER SHOVELS DRAGLINES CRANES EXCAVATING MACHINERY

BAY CITY, MICHIGAN

April 18, 1938

Engineering News-Record
330 W. 42nd Street
New York, New York

Gentlemen:

We hesitate to refer to performance claimed by BAY CITY owners, particularly as during the past six months BAY CITY owners have told us of performance in terms of yardage which we frankly find it difficult to believe.

Attached is a photo of a BAY CITY Model 20 crane with 3/8-yard clamshell and 35' boom owned by Butler Motor Service, Franklin Grove, Illinois. This machine is shown operating at the gravel plant of Rocho Construction Company at Amboy, Illinois. Rocho was working on a large penalty road job and rented the machine from Butler Motor Service to feed his gravel washing plant. The competitive 3/8-yard machine in the background was unable to handle the daily tonnage required and was taken off the job.

Mr. Rocho, who does not own the machine but was responsible for the job, insists this 3/8 yard BAY CITY machine loaded 110 yards of gravel per hour into his washing plant. This yardage, which amounts to over a thousand yards in ten hours, would be considered excellent performance for a 3/4 or one cubic yard machine.

The speed with which the machine is being operated and the ability of the operator is shown in this action picture where the operator has started to swing back to the gravel pile before the clamshell bucket has completed dumping.

Please prepare an advertisement to feature this performance and run it in an early issue with the enclosed photograph.

Yours very truly,
BAY CITY SHOVELS INC.

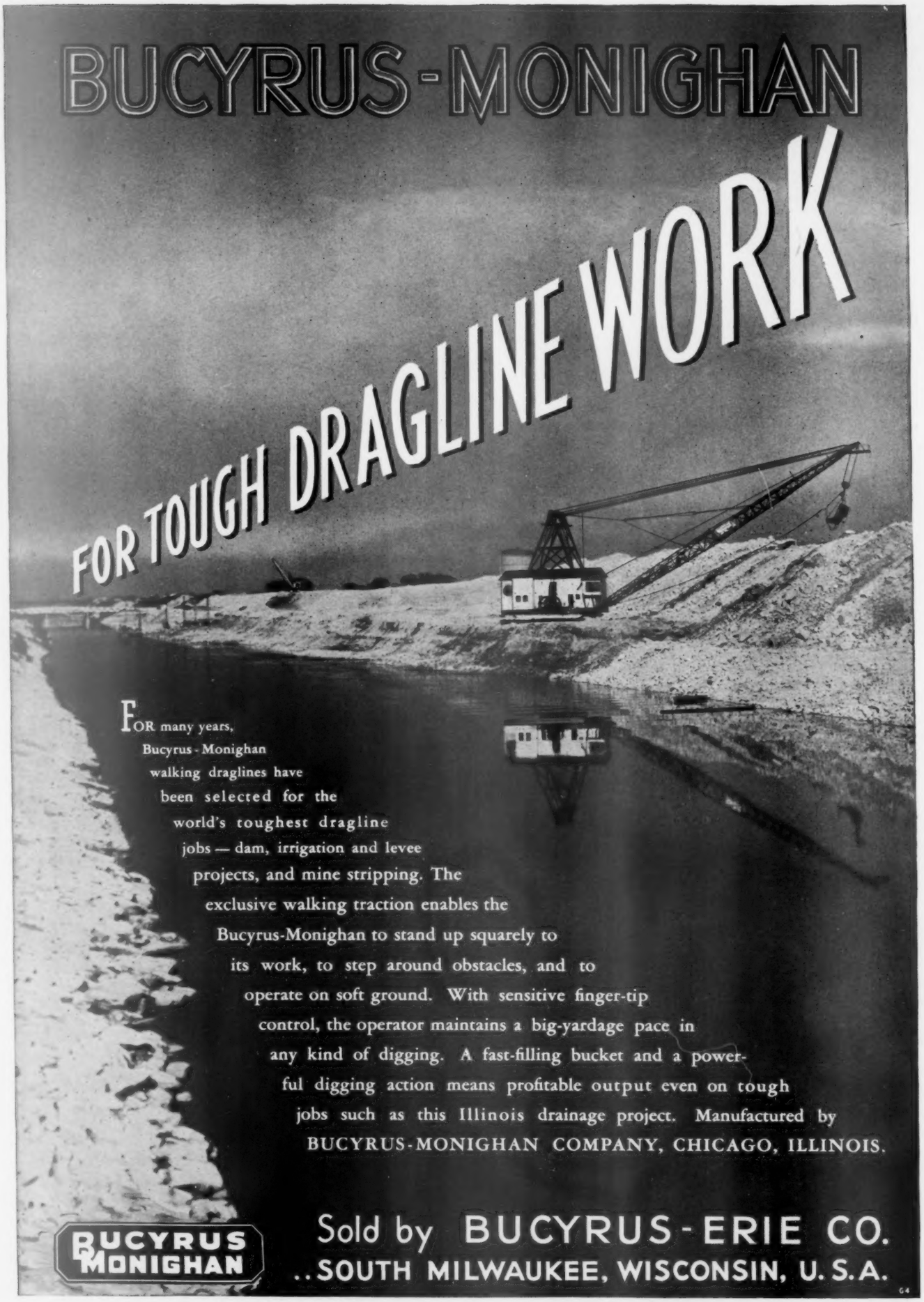
MORGAN RAMSAY,
Vice-President.

BAY CITY Model 20-$\frac{3}{8}$-yard crane was the neck of the bottle. . . . Its capacity was the entire plant's capacity . . . so says Stanley E. Bates of Tractor & Equipment Co., who adds: *"Careful, conservative, cautious Mr. Rocho stated that the little Bay City 20 started 110 cu. yds. of gravel through the plant per hour, day in and day out, for several weeks! If any Bay City salesman ever claimed HALF that production to a prospect he would be put down as a colossal liar."*

If you like this swing music see your dealer or write Bay City Shovels, Inc., Bay City, Mich.

BUCYRUS-MONIGHAN

FOR TOUGH DRAGLINE WORK



FOR many years, Bucyrus-Monighan walking draglines have been selected for the world's toughest dragline jobs — dam, irrigation and levee projects, and mine stripping. The exclusive walking traction enables the Bucyrus-Monighan to stand up squarely to its work, to step around obstacles, and to operate on soft ground. With sensitive finger-tip control, the operator maintains a big-yardage pace in any kind of digging. A fast-filling bucket and a powerful digging action means profitable output even on tough jobs such as this Illinois drainage project. Manufactured by BUCYRUS-MONIGHAN COMPANY, CHICAGO, ILLINOIS.

BUCYRUS MONIGHAN

Sold by BUCYRUS-ERIE CO.
..SOUTH MILWAUKEE, WISCONSIN, U. S. A.

64

DEMPSTER DUMPSTER

Simple as 1-2-3

The Dempster-Dumpster is the modern, time-saving, profit-producing method of loading, hauling and discharging materials. The most popular equipment on the market for hand loading jobs—in quarry, road work and general construction.

It enables the trucks to operate continuously for full time, keeps the material moving like clockwork from job to dump, insuring peak efficiency on contracts.

(Exclusive sales territory available for responsible dealers.)

Write for details

1 LOADING

Showing the Dempster-Dumpster detachable bucket sitting flat on the ground fully loaded ready for pick-up. These containers can be spotted on the job at convenient points where material is handled.

2 HOISTING

Here is the Dempster-Dumpster filled with material and now hoisted on the truck unit to be hauled to destination. It is easy, fast and economical. No waiting or costly delays.

3 DUMPING

Close-up view of the Dempster-Dumpster showing the operation of the hoisting device and the method of dumping. Hoisting and dumping is automatic with one-man control. One truck unit may serve from 4 to 10 detachable containers according to distance of haul.

Equipment shown in this ad is protected by four U. S. Government Patents, with others applied for. trade-mark "DEMPSTER-DUMPSTER" is registered.

DEMPSTER BROTHERS, INC.
KNOXVILLE, TENNESSEE

the Belt

IRONSIDES CONVEYOR

the Results:

Uninterrupted Service of conveying crushed stone daily at a lower cost per ton

Conveyor and Elevator Belts manufactured by QUAKER are custom-built . . . each belt made specially to fit the operating conditions, thus insuring the correct construction for the particular job where it is to be used.

Special woven duck is used . . . ordinary duck is not sufficient for QUAKER. Friction defies separation. The cover is of "live" rubber that does withstand the hard abrasive wear from the material being conveyed. Finally, the belt is scientifically "cured" by the latest known advancement in rubber manufacture. The finished product . . . a QUAKER belt that merits your respect.

Let QUAKER estimate on your next belt. Our experts may be able to surprise you with their low figures. The price of a stamp is your only cost to find out.

QUAKER CITY RUBBER COMPANY

OVER 50 YEARS OF CONSISTENT QUALITY

PHILADELPHIA · NEW YORK · CHICAGO · SAN FRANCISCO

BRANCH OFFICES

Birmingham, Ala.
1304-6 North First Ave.
Butte, Mont.
41 East Broadway
El Paso, Texas
1417 Texas Street
Los Angeles, Calif.
2001 Santa Fe Ave.
Denver, Colo.
1835 S. Emerson Street
Newton Highlands, Mass.
130 Needham Street
New York, New York
200 Church Street
Richmond, Va.
12 North 15th St.
Salt Lake City, Utah
418 Dooly Bldg.

● Users of Rock Drills know that Clevelands, besides being fast cutters, require less air for efficient operation. This means a lot, especially when the machines are being run from a portable compressor. In consuming less air, Clevelands insure maintaining the pressure, and keeping the pressure up means better hole cleaning, stronger rotation, more footage—and with easier work for the compressor to do.

When your compressor labors and gets hot, when it keeps pumping all the time, and yet never gets the pressure up, put Clevelands on, and watch her settle down to popping off several times a minute! You get more work out of your equipment, and, at the same time, you experience no breakdowns, delays, and excessive repair costs!

If you don't know Clevelands, try one out with your own operator, and on your own job. Demonstration any time, anywhere. Catalog on request.

THE CLEVELAND ROCK DRILL COMPANY

3734 EAST 78TH STREET • CLEVELAND, OHIO

Cable Address: ROCKDRILL

LEADERS IN DRILLING EQUIPMENT

We lubricate EACH WIRE TO INSURE LONG LIFE

AMERICAN TIGER BRAND WIRE ROPE

American Tiger Brand Wire Rope
Electrical Wires & Cables
Amerclad All-Rubber Cables
Aerial Tramways
Tiger Wire Rope Slings
Tiger Wire Rope Clips

LUBRICATION at each point of contact in wire rope is of equal importance to that in any complicated machine*. It reduces external wear, prevents corrosion, cuts down internal friction and enables each strand to move freely — all of which results in increased useful life.

Every wire of American Tiger Brand Wire Rope is carefully lubricated. This adds vitally to the flexibility of the rope, enabling it to withstand the terrific jerks of starting and stopping.

This lubrication is the result of years of engineering and field experience and is but one of the many different features which make American Tiger Brand Wire Rope a profitable operating investment for you.

American Tiger Brand Wire Rope is available in either Standard (non-preformed) or Excellay (preformed) constructions.

*** Machine? Absolutely, wire rope is a machine. It fits perfectly the dictionary definition, "Any combination of mechanism for utilizing or applying power."**

AMERICAN STEEL & WIRE COMPANY

Cleveland, Chicago and New York

COLUMBIA STEEL COMPANY, Russ Building, San Francisco

United States Steel Products Company, New York, *Export Distributors*

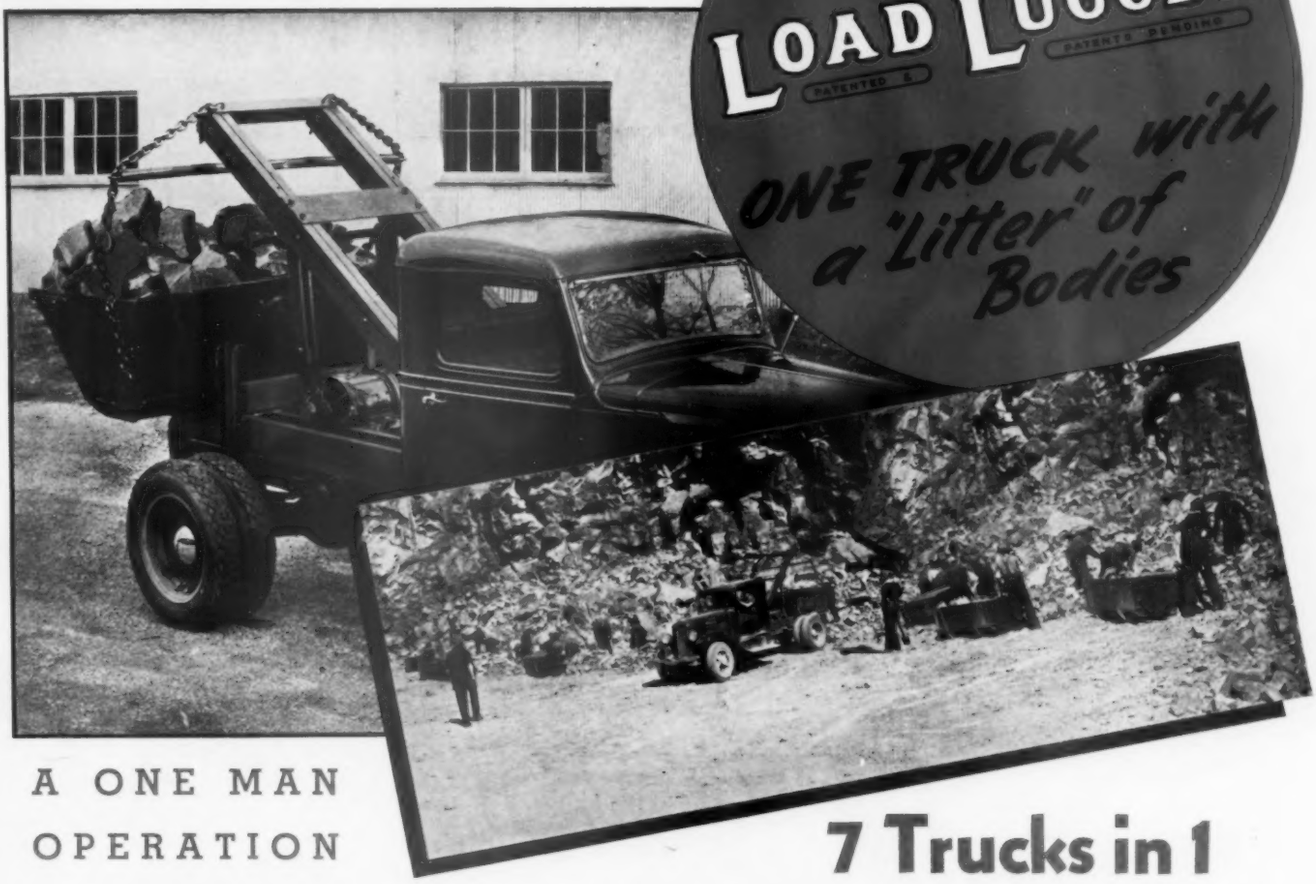
UNITED STATES STEEL

The NEW Low Cost Method of Hauling and Dumping—

The Brooks LOAD LUGGER

PATENTED & PATENTS PENDING

ONE TRUCK with a "Litter" of Bodies



A ONE MAN OPERATION

With a single minor exception — hooking the bucket chains before raising load — the Brooks Load Lugger is a one man operation from driver's seat. The one piece, sturdy buckets are carried on the truck itself, with no counter-weights required . . . no suspended load . . . no side swing, and dumped instantly and automatically. Built in 4 capacities . . . one of which will fit your requirements.

7 Trucks in 1

Never before, we believe, has a piece of equipment been produced to equal the Load Lugger, in its field, for production economy. It is practically fool-proof in operation, and, mountable on any truck chassis in a few hours. No sheaves, cables, high-pressure hydraulic hose or "gagets" are used . . . and consequently no costly replacements. The Load Lugger has a direct drive from power take-off to Hydraulic Pump Hoist, and which, is positive in both up on down motions.

The amazing possibilities of the Brooks Load Lugger in cutting hauling and dumping costs are almost unbelievable. Yet, wherever loading is done by hand, one truck and 5 to 10 Load Lugger buckets may replace an equal number of trucks, depending, to some extent, upon the distance of the haul.

Cash in on the Brooks Load Lugger at once. Write or wire for complete details. Demonstrations arranged.

BROOKS EQUIPMENT AND MFG. CO.
KNOXVILLE • TENNESSEE

Manufacturers of the nationally known DAY "Jaw-Type" Rock Crushers, DAY "Swing-Hammer" Crushers or Pulverizers. A complete line for any desired capacity.

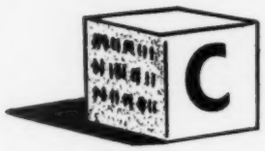
CUTS HAULING & DUMPING COSTS TO THE BONE

ABC

ADVANTAGES OF CINCINNATI CONVEYOR BELTS INCREASE CONVEYING EFFICIENCY

ADDED SERVICE

BIGGER TONNAGE



COST OF BELT LOWER PER TON CONVEYED

Sand and gravel and rock crushing plants in every part of the United States are conveying materials on Cincinnati Belts more efficiently because of these advantages . . . and in addition, they are realizing a bigger return on their belt investment.

Ask the Cincinnati Belt man today about important conveying facts from plants near you.

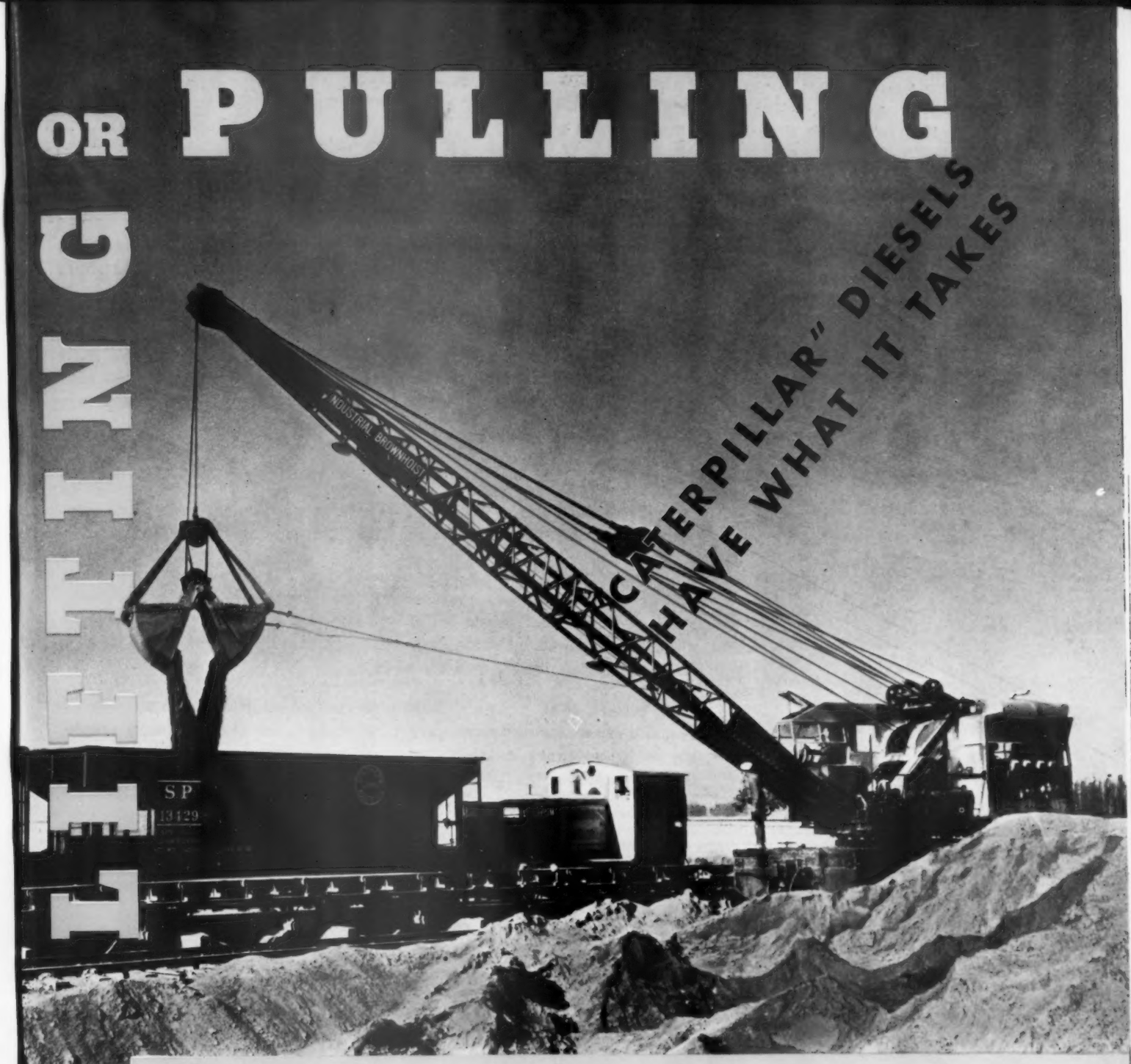
THE CINCINNATI RUBBER MFG. CO. - - CINCINNATI, OHIO

New York Detroit Pittsburgh Boston Chicago Atlanta Buffalo Philadelphia

CINCINNATI

CONVEYOR AND ELEVATOR BELTS

LIFTING OR PULLING



POWER — dependability — and matchlessly low operating cost! That's why "Caterpillar" Diesels are used for both "vertical" and "horizontal" sand-and-gravel moving at this California plant.

A 160-horsepower "Caterpillar" Diesel Engine, in an "Industrial Brownhoist" locomotive crane, does the loading.

A 125-horsepower "Caterpillar" Diesel Engine, in a "Plymouth" industrial locomotive, moves the railway cars about. (Two other similarly powered locomotives are also on the job.)

And this is just one of many instances of modern "Caterpillar" Diesel Engines supplanting other types of power on pit-and-quarry work throughout the world. Using low-cost Diesel fuel, they fit all kinds of applications: Operating rock crushers, screening-and-washing equipment; compressors for rock-drilling; bulldozers and shovels for removing overburden; cranes for loading; tractors and locomotives for hauling.

If you want to do it *better, quicker, cheaper,* any leading equipment manufacturer can fill the bill — with "Caterpillar" Diesel power. And what's more, "Caterpillar" parts-and-service facilities are the most complete of any engine manufacturer in the world. *Nine engine sizes — 32 to 160 horsepower.*

CATERPILLAR TRACTOR CO., PEORIA, ILL.

CATERPILLAR DIESEL POWER

REG. U.S. PAT. OFF.

DIESEL ENGINES • TRACK-TYPE TRACTORS • ROAD MACHINERY

Do You Know That . . .

"the use of a multiple-V drive allows operation on shorter centers than any other type of belt drive; in fact, the centers are as short as in chain drives." (p. 455, *Power Transmission.*)

"many operators who must strip overburden from their deposits have developed markets for this material and are able to sell it, if not for a profit, at least for a price that will pay a part of the cost of removing and disposing of it." (p. 74, *Dry Removal of Loose Overburden.*)

"the principal objection to storage over a tunnel is that only about half the contents of the pile will flow to the conveyor by gravity. Unless one is willing to have a large dead storage for emergency use . . . " (p. 320, *Storage and Reclamation.*)

"since the vibrating screen handles a thin bed of material at a very rapid rate, it has considerably more capacity than a revolving screen even when compared only on the basis of the area which is covered by material. Disadvantages are the danger of . . . (p. 259, *Screening, Classifying and Washing.*)

"plants that produce fluxing stone in addition to commercial crushed stone normally use gyratory crushers for their primary crushing, as a gyratory crusher produces more stone of the proper size for fluxing-stone purposes than does a jaw crusher. Cement and milling plants . . . . (p. 43, *Plant Design.*)

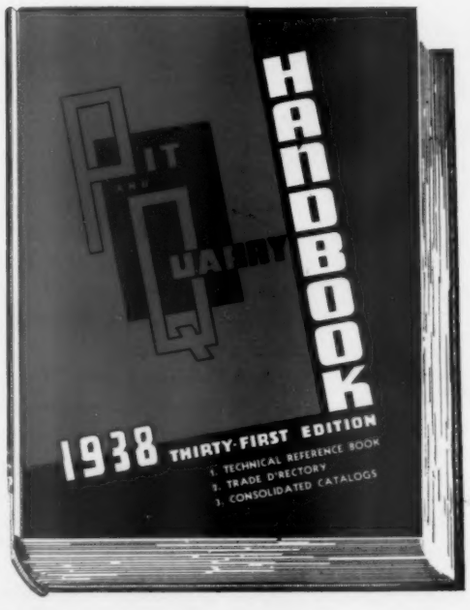
"pan conveyors will not handle fine materials very well, on account of leakage between the plates, but will carry lumps up to the ability of the conveyor to stand the weight and impact. They will take less power than . . . . (p. 232, *Elevating and Conveying.*)

These and thousands of other equally interesting and useful facts will be found in the 1938 edition of Pit and Quarry Handbook. Are you using your copy as often as you should? Do you turn to it when you are brought face to face with a new, baffling problem?

Whether the question is one of plant design or plant operation you can be almost certain of finding help in the handbook. Open it to-day—at any chapter, at any page—and see if it does not repay you for the time and effort with new facts, new interpretations, new slants. Get the habit of making it serve you as it does many hundreds of other "practical" and "technical" operating men.

If you are a producer of aggregates, cement, lime, gypsum or other nonmetallic minerals and do not own a copy of the new edition of Pit and Quarry Handbook, send in your application for one on your company letterhead. Simply state what use you expect to make of it, and what your position is. We still have a limited number of copies available for free distribution among nonmetallic-mineral producers only.

PIT AND QUARRY HANDBOOK
538 South Clark Street **Chicago, Ill.**

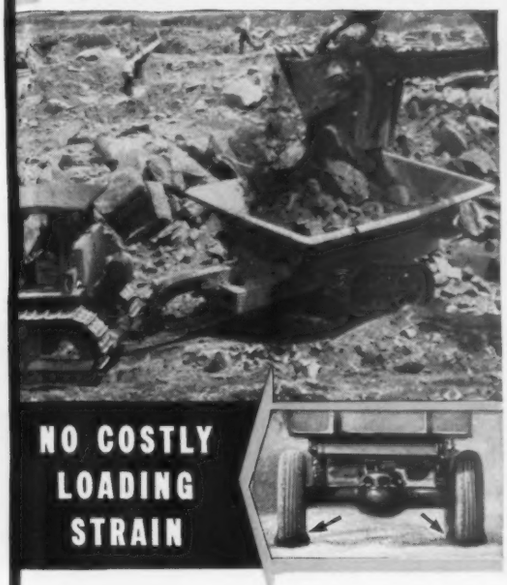


YOU ESCAPE THESE HIDDEN HAULING COSTS

WITH

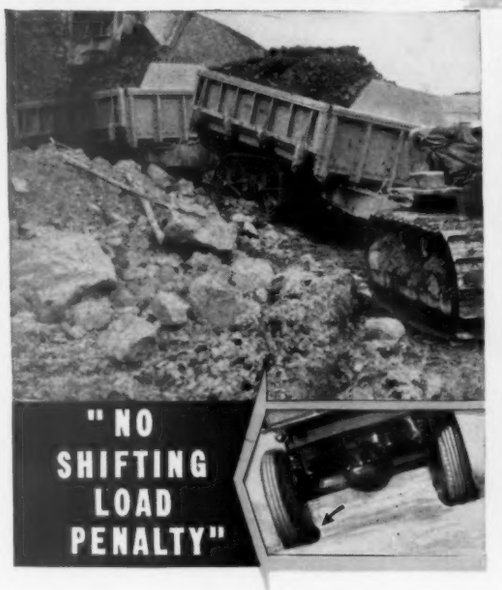
ATHEY FORGED-TRAK WAGONS & TRAILERS

If you are looking for hauling equipment that will lessen your present hauling cost and overcome your hauling hazards, turn to Athey Forged-Trak Hauling Units pulled by "Caterpillar" Diesel Tractors. That's the *proved* way to speed up work and save money. See your "Caterpillar" Dealer or write us. ATHEY TRUSS WHEEL CO., 5631 West 65th Street, Chicago, Illinois. Cable Address: "Trusswheel," Chicago.



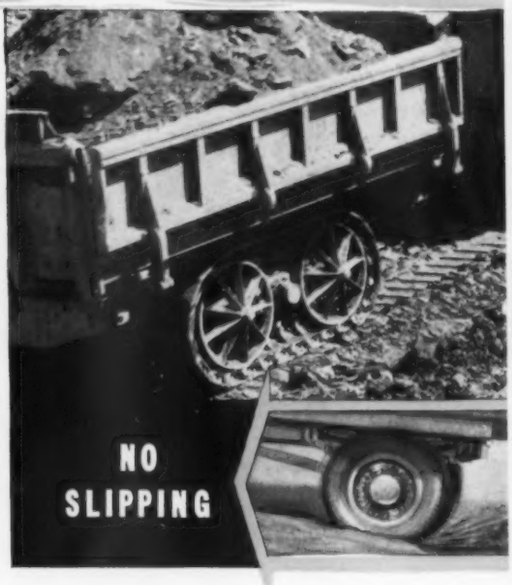
NO COSTLY LOADING STRAIN

Great weight dropped by the loader carries a tremendous impact to tires—results in high tire costs. Athey Forged-Trak Units *absorb* the overload caused by impacts of loading. Their double husky bodies, too, can "take it."



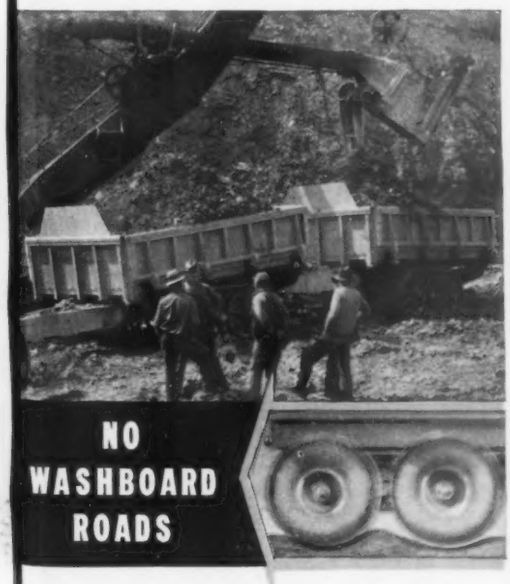
"NO SHIFTING LOAD PENALTY"

Uneven roadways result in shifting loads that cause early tire blow-outs and heavy replacement costs. With Athey Forged-Trak Units, steel wheels rolling over steel rails on a self-laying bed of steel, take care of road inequalities.



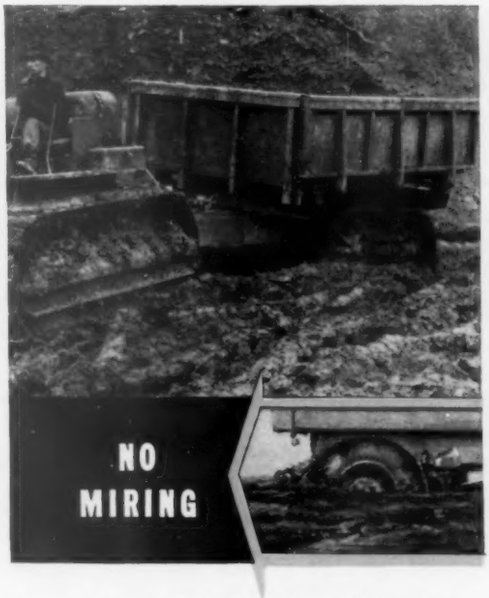
NO SLIPPING

Slippage of round wheels on gravel, wet clay, loose stone, or slippery surfaces, or on bumpy, rutted or uneven haul roads means greater wear and tear on equipment and tires. The track-type principle of Athey Forged-Trak Dump Trailers reduces slippage to a minimum.



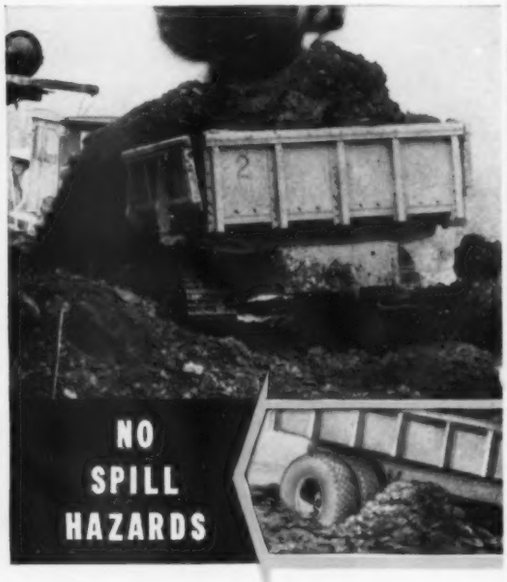
NO WASHBOARD ROADS

"Washboard" roads hammer the life out of heavily loaded rubber tires . . . set up vibration of the equipment that results in breakage and rapid deterioration. Washboard roads *do not exist* for Athey Forged-Trak Wheels.



NO MIRING

Athey Forged-Trak Wheels—self-cleaning—have a solid, contact area far greater in weight-supporting ability than dual or any practicable multiplicity of round wheels. They do not slip, spin or dig ruts. Their broad tracks tamp the surface; build up the road base.



NO SPILL HAZARDS

Excessive spill causes difficulty in moving the loaded truck from under the loader, and frequently necessitates cleaning up the spill. The husky, rigid frames and three-point spring suspension of Athey Units eliminate the hazards to hauling equipment under the loader.

ATHEY FORGED-TRAK (REG. TRADE MARK) **ATHEY WAGONS & TRAILERS**

FREE **Riggers' Hand Book**

55 pages of just the information every rigger needs and wants. Write today for your copy. No charge. No obligation.

Tough Rope for Tough Jobs

"Flex-Set" Preformed Yellow Strand is especially recommended for hoist line, crowd rope, rack rope and swinging lines on power shovels; for dragline and hoist line on dragline machines; for holding line and closing line on clam shell buckets.

Almost any wire rope will serve well enough in some places — but where the going is rough — *and tough*, there "Flex-Set" Preformed Yellow Strand shows its super-quality — its unquestioned ability to *"take it,"* and *"like it."*

This is the same Yellow Strand that has been "taking it" successfully for many years — the same specially drawn wire, tested and selected — the same careful manufacture by the same company that is now *62 years young*.

The difference results from preforming, which sets the strands to the helical form they maintain permanently in the finished rope. Thus "Flex-Set" Preformed Yellow Strand is largely pre-broken in. It is limp — easy to handle and install — highly resistant to kinking, fatigue and wear.

With these properties, how could it be other than economical? Try it!

BRODERICK & BASCOM ROPE CO., St. Louis

Branches: New York, Chicago, Seattle, Portland, Houston; Factories: St. Louis, Seattle, Peoria

U-9R1

"Flex-Set" Preformed YELLOW STRAND

REPUBLIC
CONVEYOR BELTS
can Take Abuse!

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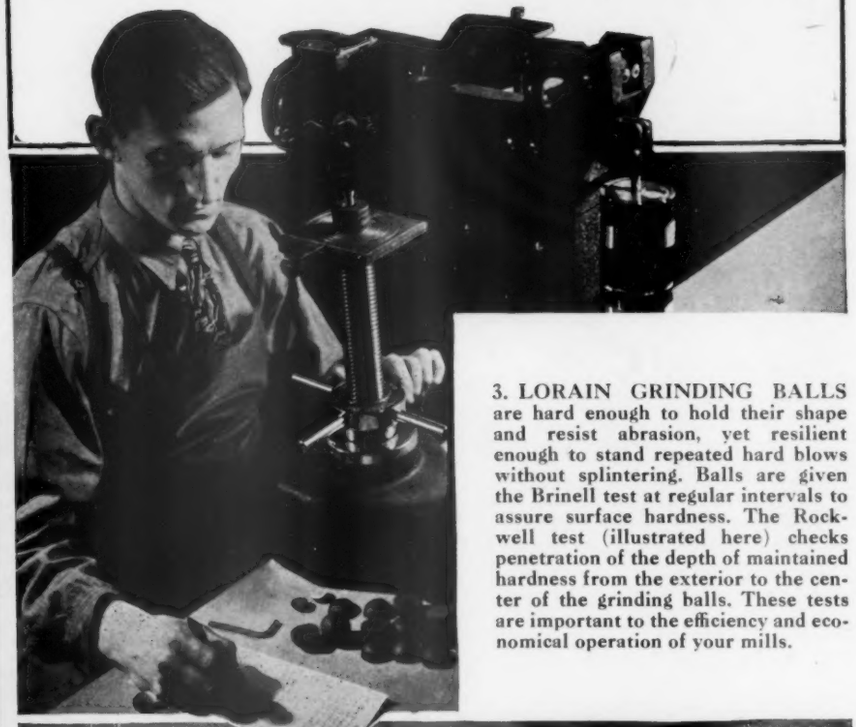

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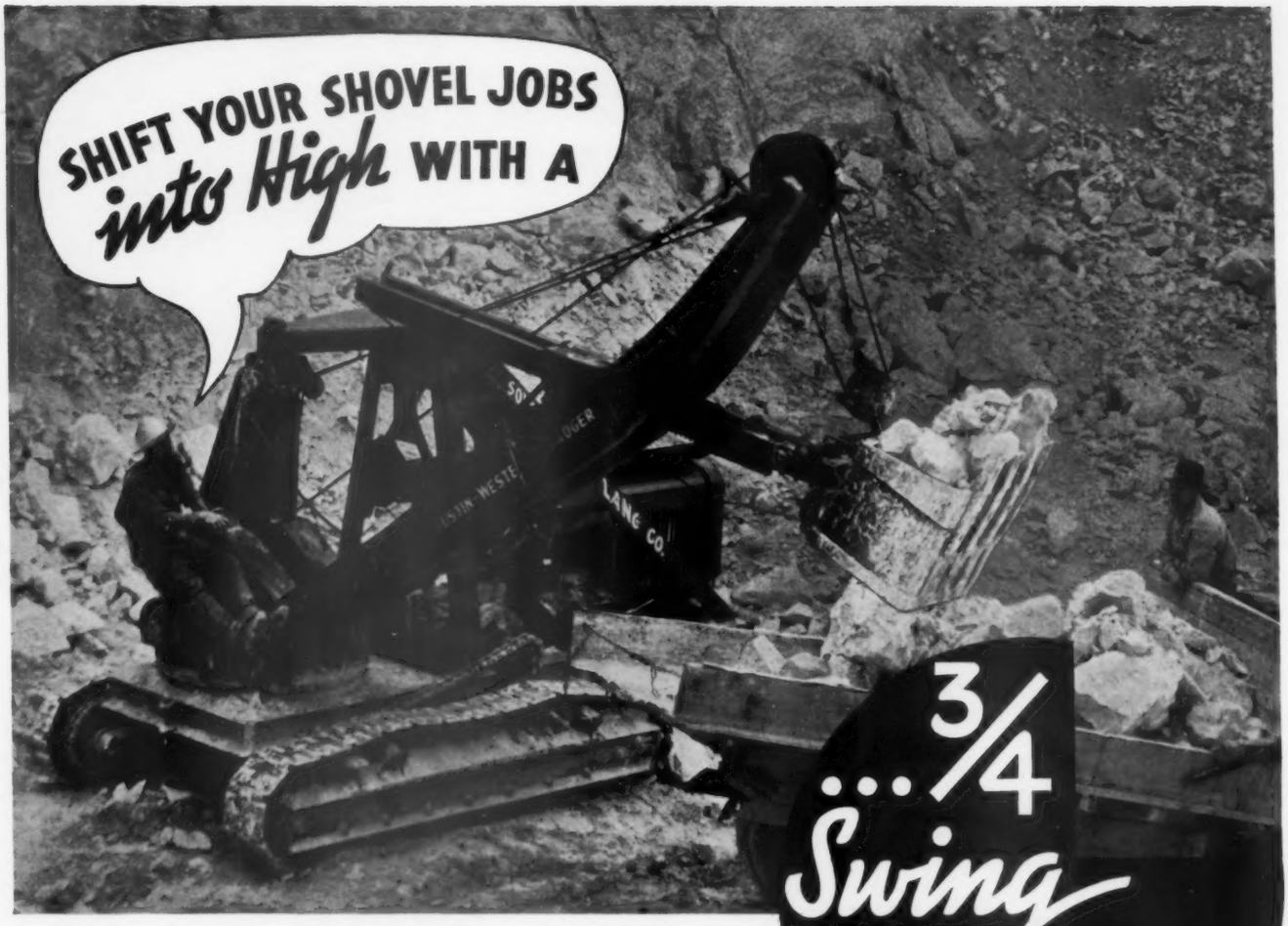

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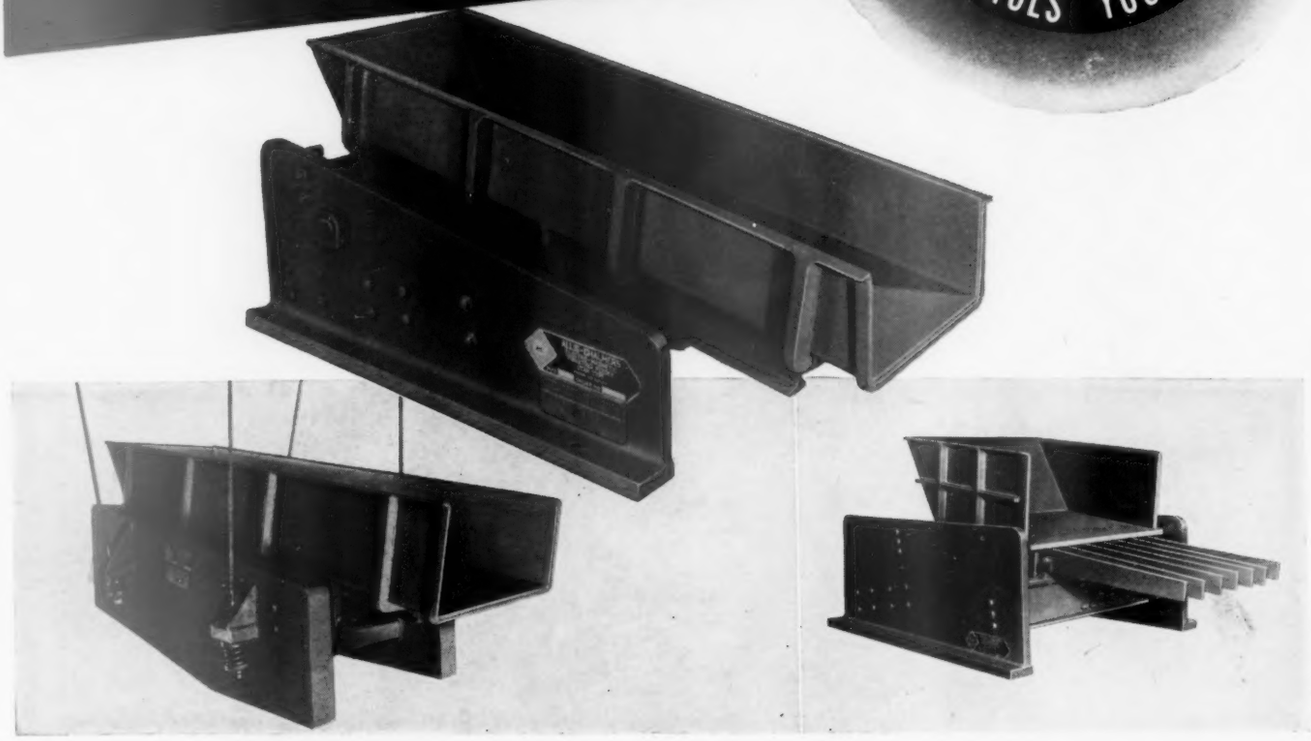

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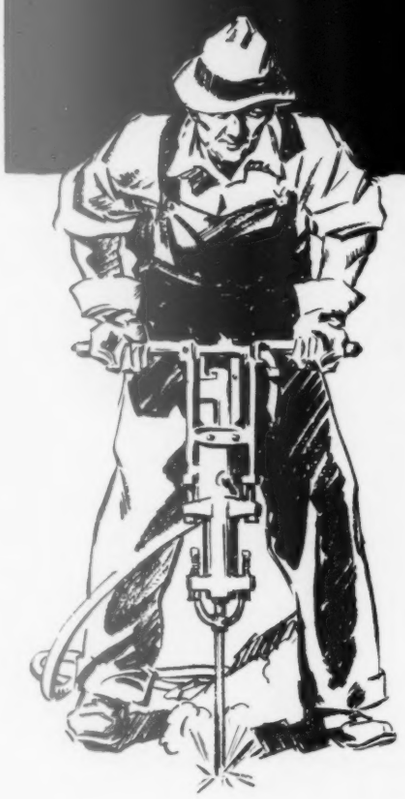

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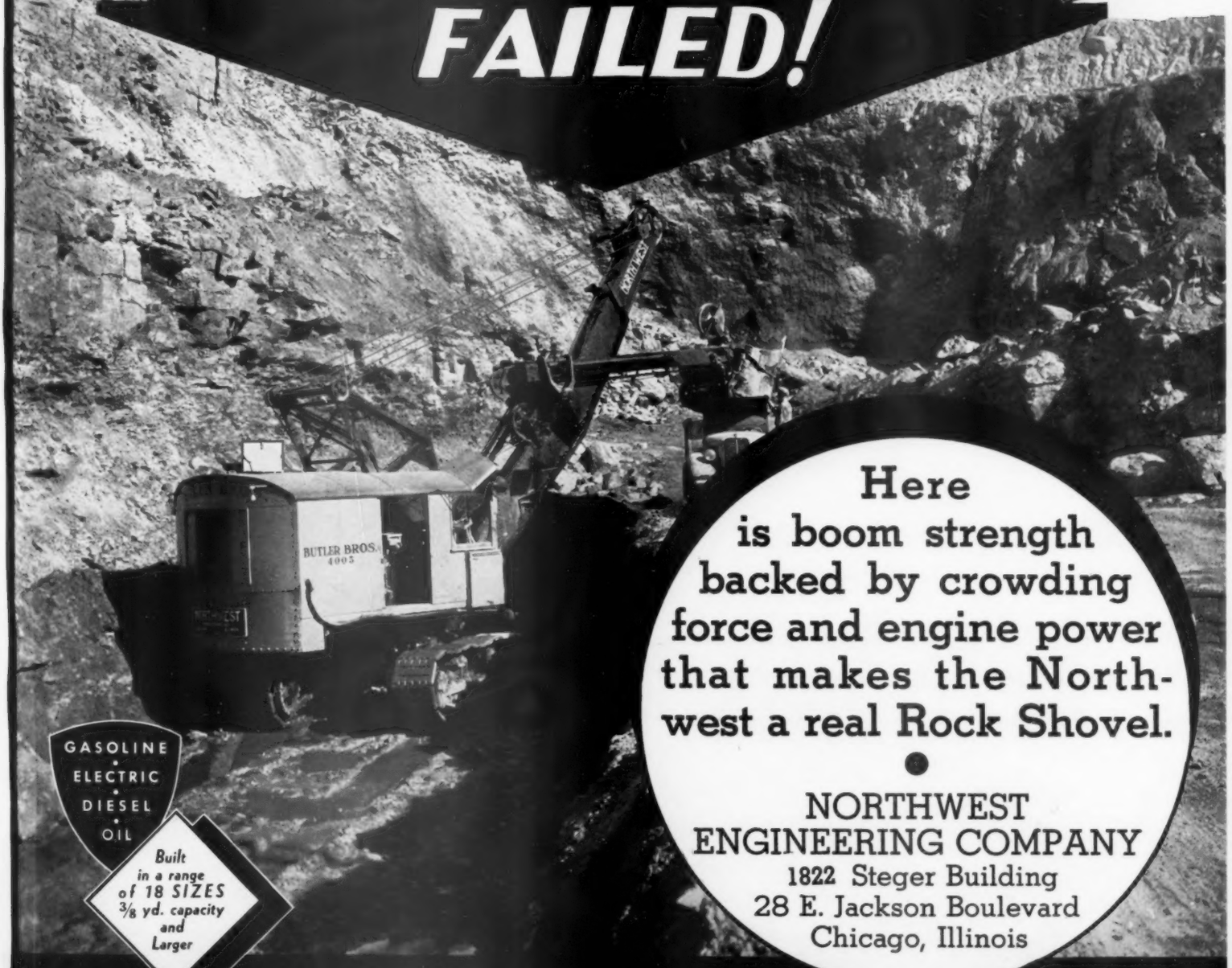

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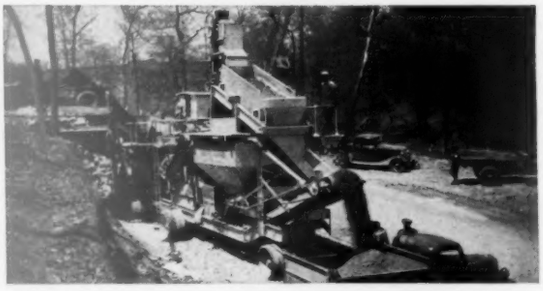

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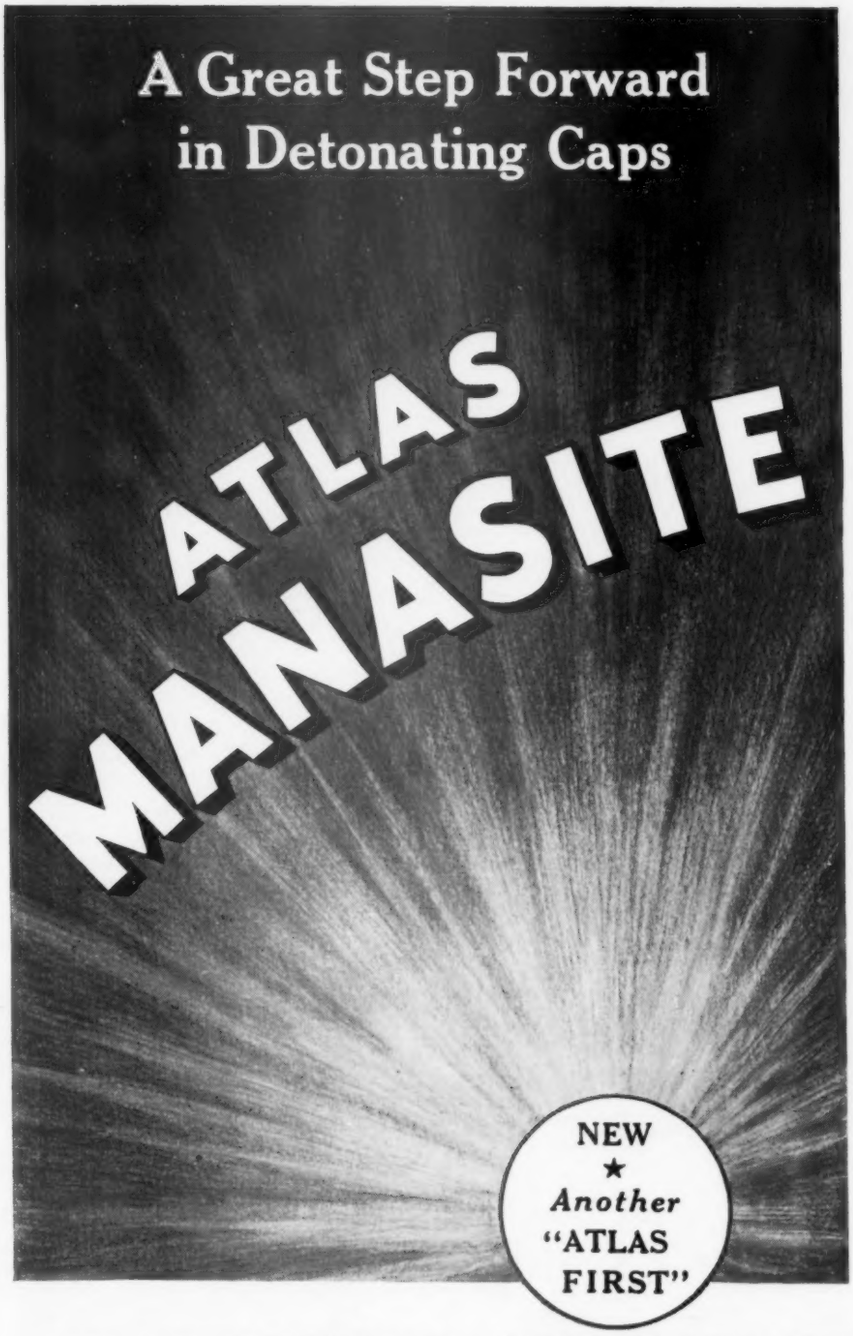

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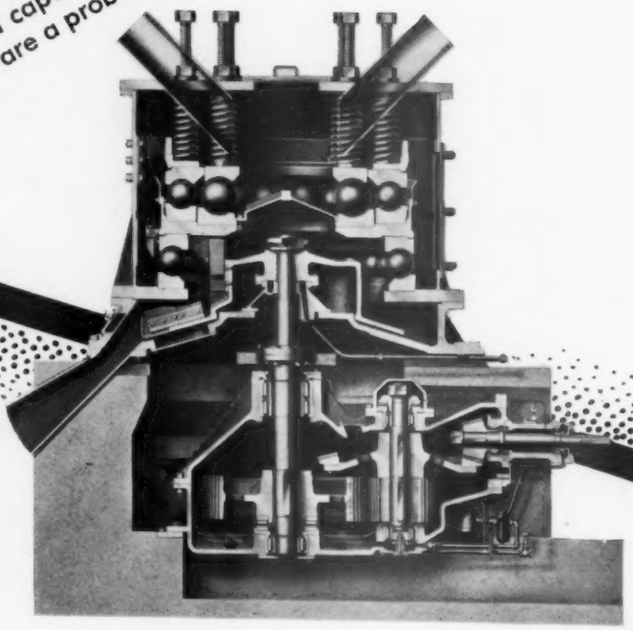

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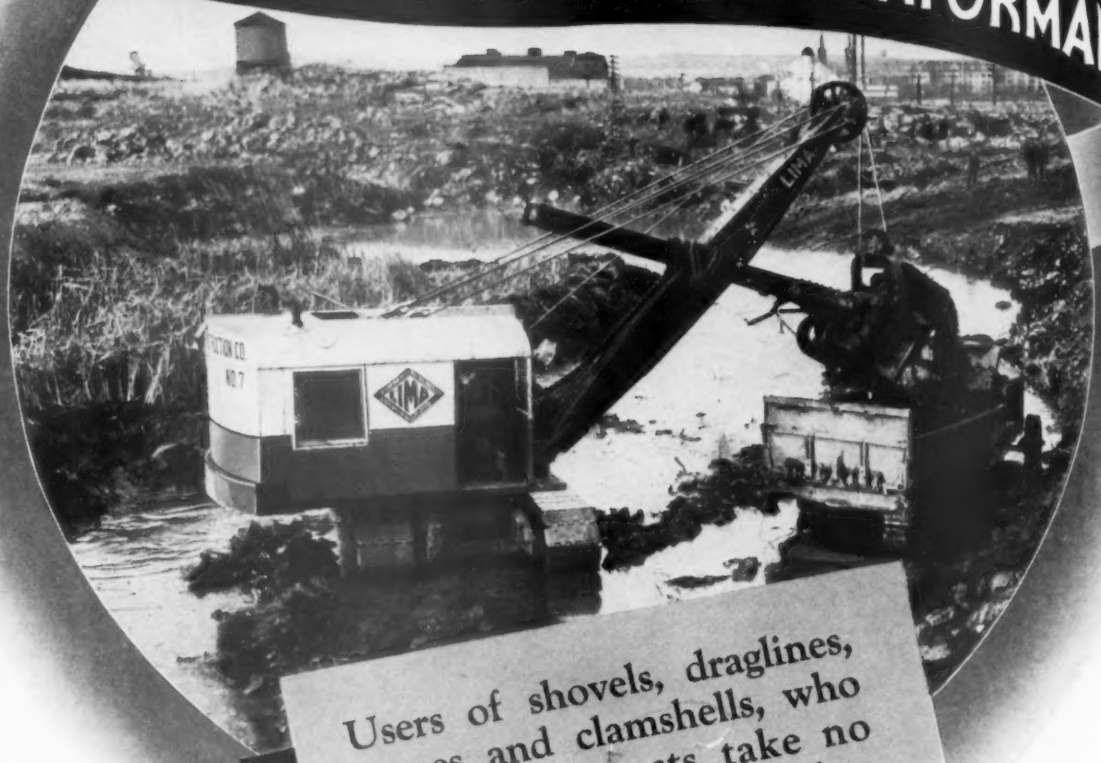

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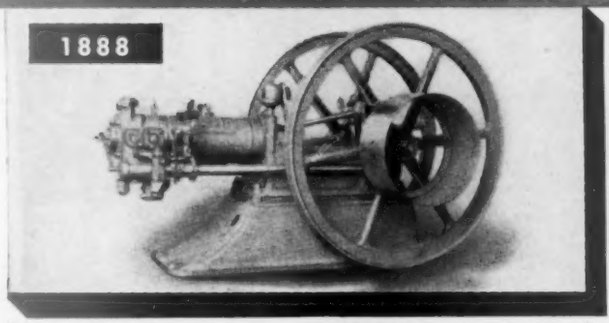

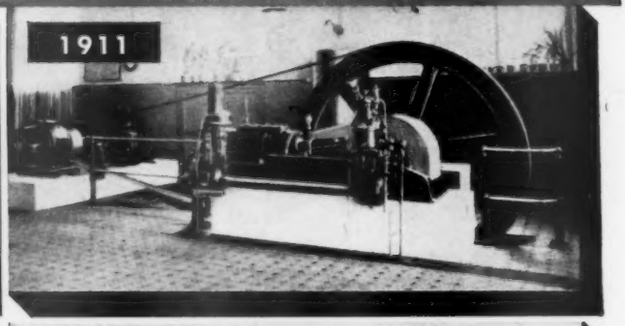

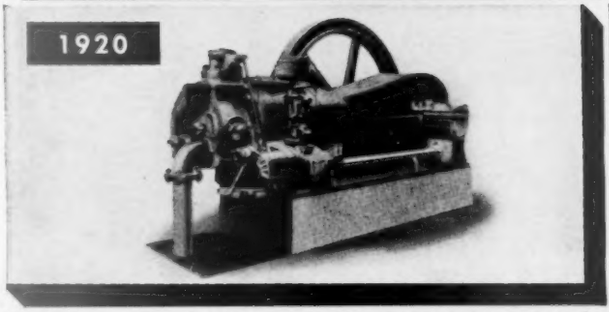

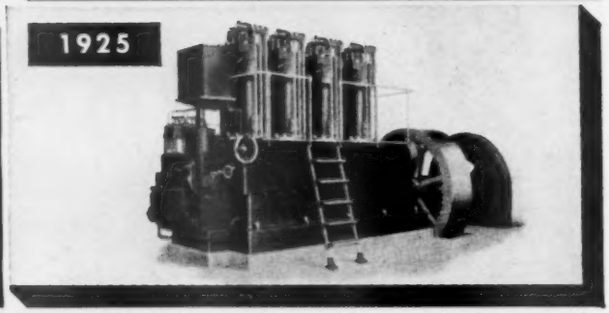

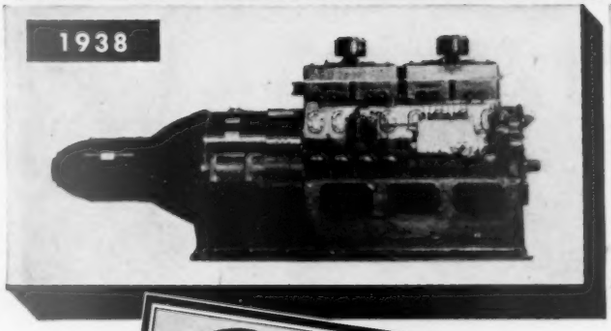

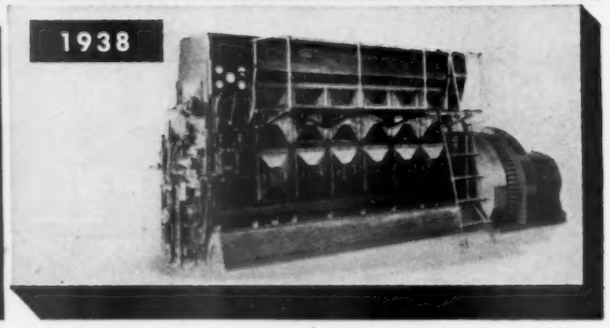

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PIT AND QUARRY

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PIT AND QUARRY

CHICAGO MAY, 1938

Cincinnati to Greet Nation's Lime Makers

ANNUAL GATHERING MAY 9-11

Arrangements for the twentieth annual convention of the National Lime Assn. to be held May 9, 10, and 11, at the Netherland Plaza, Cincinnati, O., are just about complete. A meeting of the board of directors and executive committee has been scheduled for the morning of May 9. The convention proper will start at 2:00 p.m. The highlights of the afternoon session include an address by S. Walter Stauffer, president and general manager of the association; a discussion by Myron S. Hazen, manager, service division, American Agricultural Chemical Co., on mutual interests of the lime and fertilizer industries; and a report by Prof. Walter C. Voss on mortar research activities at M. I. T. during the past year.

On Tuesday morning, May 10, a representative from E. I. duPont de Nemours Co. will discuss the use of explosives in the quarrying of limestone. V. J. Azbe is scheduled to present some interesting data on the burning of lump lime and spalls in vertical gas-fired kilns and the construction of economical kilns.

Beginning with a luncheon at 12:30 p.m. on May 10, and continuing throughout the afternoon, a construction lime session has been arranged. In addition to the representatives of lime manufacturers and others attending the convention, invitations to this luncheon and meeting will be extended to architects, engineers, and builders in the Cincinnati area. Prof. Walter C. Voss will present a lantern slide discussion on the subject, *Why Masonry Walls Leak*, which has been received enthusiastically by the building profession in a number of eastern and southern cities. Following the talk, the meeting will be opened for general discussion and the answering of questions from the floor.

The annual banquet and accompanying entertainment features have been scheduled for 7:00 o'clock on the evening of May 10.

On Wednesday morning, May 11, there will be papers covering the subjects of safety and accident prevention, the use of Diesel power in the lime industry, and the use of lime in the treatment of sewage and industrial wastes. The latter discussion will be presented by a noted authority, Dr. Willem Rudolfs, chief, division of water and sewage research, Agricultural Experiment Station, New Brunswick, N. J.

New Hydrating System at Oregon Lime Plant

A $20,000 hydrating system and a new lime kiln are being installed in the Williams, Ore., plant of the Oregon Lime Products Co., of Grants Pass, Ore. The installation is being made under the personal supervision of William J. Kuntz, president of the Lime & Hydrate Plants Co., York, Pa.

The Williams Creek plant recently resumed operations following a shutdown caused by a slide of 2,000 tons of earth into the quarry during the heavy rain and snowfall experienced in that section in the winter months.

Dolese & Shepard See Good Outlook for Year

Sales in 1937 by Dolese & Shepard Co., important crushed-stone producer in the Chicago area, were 285,000 cu. yd. less than in the preceding year, according to the annual report of the company just released.

"The outlook for 1938 seems promising because of the greater demand in the offing for fluxing stone, crushed stone, limestone sand and pulverized stone at higher prices, both from the normal users of our commodities and from governmental agencies," declares Wm. Roy Carney, president, in his report to stockholders.

Two Texas Companies Land Cement Awards

LONGHORN, TRINITY BID $1.97

Contracts covering 750,000 bbl. of low-heat Portland cement for Marshall Ford Dam at a total cost to the government of $1,399,600 have been awarded to two Texas companies. Bids were competitive.

The Longhorn Portland Cement Co. of San Antonio offered to furnish 375,000 bbl. at a net delivered cost of $1.78 per bbl., while the Trinity Portland Cement Co. of Dallas offered to furnish the entire amount at a net cost of $1.91 per bbl., or any amount less than 500,000 bbl. at a net delivered cost of $1.97 per bbl.

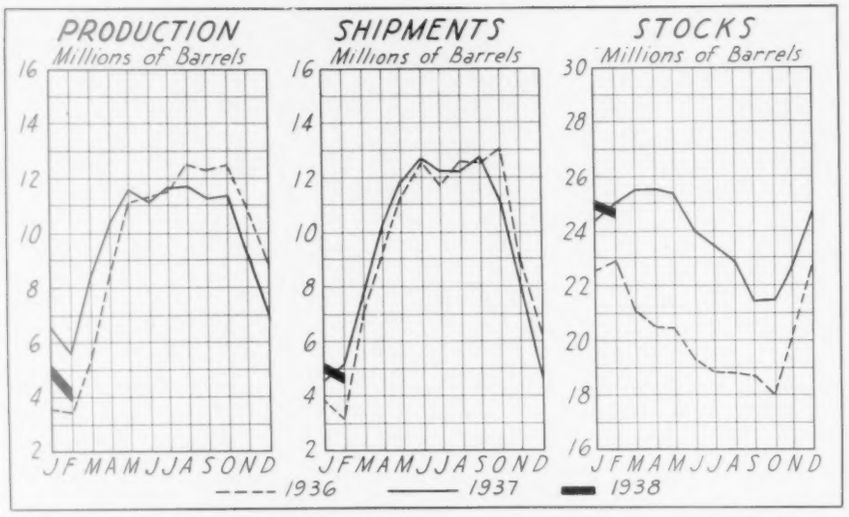
To receive the lowest price under which the required monthly delivery of 85,000 bbl. could be obtained, the Longhorn Portland Cement Co. was awarded a contract for 410,000 bbl. and the Trinity Portland Cement Co. for 340,000 bbl. at a net cost of $1.97 per bbl.

Presque Isle Project Quarry Soon to Open

The 800-ft. railroad track over which will be carried the 200,000 tons of riprap required for the $600,000 Presque Isle Breakwater, Marquette, Mich., is now installed, reports E. W. Seemann, project manager on the site for the general contractors, Merritt-Chapman & Scott Corp., New York, N. Y.

Other important preparatory phases of the work are progressing concurrently, Mr. Seemann says. The compressors at the quarry site are in operation, the dynamite and the compressor houses are completed; the office on the merchandise dock for the breakwater will be completed this week.

Major A. B. Jones of the U. S. Engineer Office, Duluth, Minn., is in charge of the work on the Presque Isle Breakwater which is part of the Great Lakes Waterway Project.



The Portland-cement industry in February, 1938, produced 3,916,000 bbl., shipped 4,575,000 bbl. from the mills, and had in stock at the end of the month 24,364,000 bbl., according to the Bureau of Mines. Production and shipments in February showed decreases of 32.9 and 11.4 per cent., respectively, as compared with February, 1937. Portland-cement stocks at mills were 2.8 per cent. lower than a year ago.

Awards Compensation for Unusual Death

The Virginia Industrial Commission recently awarded compensatory damages amounting to $1,800, in addition to hospital and medical bills, in the case of a death claim alleged to have resulted from excessive strain while the deceased was working in a lime quarry. Allegations were made at the hearing that the workman had been pushing a heavy truck at the quarry when the strain suddenly caused him to become violently ill. Taken to his home, he lapsed into a semi-comatose state and was rushed to the hospital where he subsequently died from a sub-arachnoid hemorrhage caused, in the belief of the attending physician, by doing inordinately heavy work. The commission agreed with this viewpoint and, in addition to the principal sum, allowed $150 for medical services.

This case is somewhat unusual the National Lime Assn. points out, inasmuch as the fatality was caused apparently by physical strain and the Industrial Commission upheld this view, even though some doubt seemed to exist in the minds of opposing witnesses as to whether death was directly attributable to this cause alone.

League Campaign Seeks to Oust "Jerry-builder"

Working in close coöperation with ethical building companies, the Home Owners' League of America has launched a campaign at Los Angeles warning the public against "jerry-builders" and unethical contractors. The league hopes to extend the campaign to other cities.

The Home Owners' League is a strictly non-profit organization maintained by home builders and owners for their mutual benefit and protection. Funds for the campaign are being donated on a coöperative basis by leading material producers and builders.

The Home Owners' League believes it offers the ideal solution for wiping out the jerry-builder. While it will not specify any product to prospective home builders seeking information from the league, the organization does give full information on how to select reputable companies and materials and how to avoid building racketeers.

New Concrete-Products Plant at Shelbyville

Under construction at Shelbyville, Ky., is the new plant of the Kentucky Concrete Products Co. Owners of the new plant are Henry Long of Shelbyville and Ray Weller of Louisville, Ky. The plant will operate, however, as a unit of the Marietta Concrete Products Co., Marietta, O.

The manufacturing building at the new plant will be 50 ft. wide and 150 ft. long.

$40,000 Fire Damage at Ohio Slag Plant

Fire caused $40,000 damage, according to press reports, when it destroyed a portion of the Standard Slag Co. plant on the property of the Wheeling Steel Corp. at Steubenville, O.

House Bill Launches Attack on Silicosis

CHANCES FOR PASSAGE SLIM

House Bill No. 9689, introduced by Congressman O'Connell of Montana and referred to the House Committee on Labor, would make it unlawful to ship or deliver for shipment in interstate or foreign commerce, goods produced under conditions exposing employees to the hazards of silicosis and related dust diseases. The Secretary of Labor is empowered to make investigations to determine the existence, nature, and extent of such hazards where exposure of employees is believed to exist, and to order the installation and operation of devices and safeguards to eliminate harmful dusts from the industry or occupation investigated.

No public hearings on this bill have been held. There is hardly a remote possibility that action on it will be had at the present session of Congress. However, V. P. Ahearn, executive secretary of the National Sand & Gravel Assn. points out that the industry should be alert to the fact that there is considerable political pressure for this type of legislation. Some states have expressed unwillingness to adopt stringent occupational-disease laws and regulations because of the unfavorable position in which such laws would place their domestic industry. This has led to a feeling in some quarters that Federal action in the interest of uniform conditions throughout the country is necessary. The present disposition of the Congress is set against unlimited delegation of power to Federal agencies, but there may be in the next Congress a determined effort, notwithstanding that attitude, to give the Federal government control over working conditions. The O'Connell bill is an instance of this type of thinking and the subject is one which should receive continuous study.

New Gravel Dredge to Operate on White River

The Mt. Carmel Sand & Gravel Co., Mt. Carmel, Ill., recently placed in operation a large new sand-and-gravel dredge on the White River, a tributary of the Wabash, about three miles upstream from its mouth.

The boat, 24 ft. by 77 ft. in size, is equipped with a 120-hp. engine. The screening tower, 30 ft. above the water, is of all-steel construction.

43,820 Miles of New Road Built by W.P.A.

AIRPORT FACILITIES AIDED

"The construction by WPA of 43,820 miles of new highways, roads, and streets has materially augmented the mileage of the public thoroughfares of the nation," says the recently-issued report of the Works Progress Administration covering the physical accomplishments on WPA projects to Oct. 1, 1937. "Rural primary roads, totaling 6,961 miles, have been constructed, of which more than 2,000 miles was paved with concrete, bituminous, brick or block surfaces. Improvements to this type of road covered over 15,000 miles, 1,900 miles of which was paved.

"Rural secondary roads built by WPA were mostly of the farm-to-market variety and totaled nearly 30,000 miles in length. Surfaces on these roads were predominately stone and gravel, although nearly 2,000 miles was hard surfaced. Repairs to existing roads of this type represented the major activity of WPA projects devoted to roadwork and totaled nearly 116,000 miles, more than 95 per cent. of which was unpaved.

"The construction of village and city streets by WPA workers reached a total of 6,319 miles by Oct. 1, 1937, nearly two-thirds of which was paved with concrete, brick, block or bituminous surfaces. Reconditioning and resurfacing was accomplished over a length of 14,848 miles of streets, mostly unpaved. Other roadside improvements included the construction of 4,600 miles of sidewalks, over 5,000 miles of curbs and gutters, and the landscaping and beautification of almost 40,000 miles of roadside.

"Existing airplane-landing fields located in 109 different places were reconditioned. More than 850,000 linear feet of airport runways, paved and unpaved, were constructed and nearly 250,000 linear feet of existing ones were resurfaced or repaired. Runways ranged in width from a minimum of 50 feet to a maximum of 350 or 400 feet. In at least one case, namely, the Cleveland Municipal Airport, nearly the entire landing area (about 210 acres) was paved with a bituminous material.

"New sewage-disposal systems were constructed and extended by the laying of about 5,700 miles of new storm and sanitary sewer lines, ranging in size from 6-in. and 8-in. laterals to trunk lines and outfalls 7 ft. to 10 ft. in diameter. Sewage-treatment plants capable of rendering safe the disposal of waste from a population of over 1,000,000 persons were built in 228 different places and more than 130 existing plants were reconditioned and enlarged."

Labor Department Film Tells Silicosis Story

Continuing its efforts to aid in the prevention of silicosis, the U. S. Department of Labor has released a motion picture depicting the harmful effects of the disease, the methods by which it may be prevented and a plea to workers, employers, and the general public to coöperate in the battle against this industrial illness.

Accompanied by sound effects and an explanation of what is portrayed, the picture, entitled *The Story of Silicosis*, is of one-reel length. It is being produced under the direction of R. Campbell Starr, secretary of the National Silicosis Conference and a member of the Labor Department staff.

Exhibit copies of the film are available to interested organizations. Requests for booking should be made to the Division of Labor Standards, U. S. Department of Labor, Washington, D. C.

Plant-Mixed Asphalt in Demand in Kentucky

The Bituminous Materials Co., Louisville, Ky., has sold several thousand tons of "Crown Rock," a patented cold-lay asphalt mix, to the Federal Works Progress Administration, the Kentucky State Highway Commission, the city of Louisville, and private firms since last July when the company was organized, J. H. Sandford, manager, reports.

"An important characteristic of this material", according to Mr. Sandford, "is the ease with which it can be laid. All that is required is that it be spread uniformly over a firm base and rolled or tamped in place. As soon as it is placed it is ready for traffic. It forms a hard, durable, compact, water-proof surface, economical and permanent because of its high wear-resisting quality. Because it is a cold-lay material it can be stocked and is thus available for prompt delivery at all times."

In an article describing the plant of the Mixed Concrete Corp., Columbus, O., published in the September, 1937, issue of PIT AND QUARRY, the statement was made that W. E. Anderson & Son control the Anderson Haulage Co. According to Archer T. Anderson of the Anderson Haulage Co. this statement is incorrect.

No Federal-Aid Cut in 1940-41 Proposal

$238,000,000 YEARLY ASKED

By unanimous action of the Committee on Roads, the House of Representatives now has before it for approval a bill which would provide Federal-aid highway appropriations for the fiscal years 1940 and 1941 (calendar years 1939 and 1940). Notwithstanding the recommendations of the president in a message to the Congress on November 30, 1937, the Committee on Roads asked that the total appropriations of 1937 and 1938 be maintained for the two coming years. It will be recalled that the president asked for a limit of not more than $125,000,000 annually. If the Congress accepts the viewpoint of the Committee on Roads, the following Federal funds will be available in each of the calendar years 1939 and 1940:

Regular Federal aid	$125,000,000
Secondary or feeder roads	25,000,000
Elimination of grade crossings	50,000,000
Forest highways, roads, and trails	14,000,000
Public-lands highways	2,500,000
National park roads and trails	7,500,000
National Parkways	10,000,000
Indian reservation roads	4,000,000
Total	$238,000,000

In addition to the sum of $238,000,000 for each of these years, the bill also authorizes $8,000,000 to assist the states in the repair and restoration of roads and bridges damaged by floods or other catastrophies.

Illinois Annual Mineral Meet at Urbana Sept. 30

The sixth annual Illinois Mineral Industries Conference will be held September 30 and October 1, at the University of Illinois, Urbana. This conference is sponsored by the Illinois State Geological Survey, the Engineering Experiment Station and the Illinois Mineral Industries Committee. Preliminary plans for the conference call for two major symposia, one on "The Future Energy Minerals" and the other on "New Frontiers for the Use of Industrial Minerals". A complete exhibit of the research work which is being done at Urbana is being planned for the information of the mineral industries of the state.

Inquiries regarding the conference may be addressed to Dr. M. M. Leighton, Chief, State Geological Survey, Urbana, Ill.

Lake Michigan Gravel Shipping Commences

FIRST LOAD INTO CHICAGO

The first boat-load of gravel of the spring shipping season was brought into Chicago on April 4 when the S.S. *Sumatra* of the Construction Aggregates Corp. fleet crossed Lake Michigan from the company's Grand Haven, Mich., plant carrying 6,000 tons of sand and gravel, unloading at the 26th St. yards.

The *Sumatra* wintered at the Grand Haven docks of the company, during which time it was overhauled and refitted for the season. About $13,000 was also spent during the winter on additions to the crushing and screening equipment at the company's Grand Haven operations.

According to J. R. Sensibar, president of Construction Aggregates Corp., more than a half-million tons of material was shipped across the lake last year and it is expected that this year's shipments will about equal that.

M. J. Grove to Erect Another Lime Plant

The M. J. Grove Lime Co. has announced plans for the development of a new quarry and lime plant at Middletown, Va.

The company, which has its main offices in Frederick, Md., already has a plant at Stephens City, seven miles north of Middletown, which has been in operation since 1899.

The company at present also has plants at Lime Kiln and Brookville, Md. Officers are Robert B. Crothers, Frederick, Md., president; F. G. White, Stephens City, Va., vice-president; James Grove, Jr., Frederick, Md., treasurer, and Clifford Yenger, Frederick, Md., secretary.

Sees Progress Upward in Canada for Cement

J. D. Johnson, president of the Canada Cement Co., Ltd., told stockholders holding their meeting in Montreal that building activity has not yet reached normal proportions and although "the industry is probably due for some setback in 1938, barring any unforeseen upset in world affairs, progress should be upward from 1938."

"There is a great deal of slack to be taken up in the building industry when conditions are favorable," Mr. Johnson added.

During the past year, the company's president said, 1,120,000 tons of stone were quarried, crushed and ground, 88,354 lb. of explosives being used in the process. There were handled and loaded or unloaded 30,000 carloads of freight in the yards of the six plants operated during the year. There were handled, ground and consumed 167,700 tons of coal, and electric power taken through the company's substations and distributed to machines, mechanical shovels and various other equipment amounted to 89,305,000 kw.-hr. of energy.

The Michigan Limestone & Chemical Co., Rogers City, Mich., recently added to the efficiency and economy of its operations by installing a Caterpillar Diesel tractor, a LaPlant-Choate Roadbuilder and a LeTourneau Carryall scraper. One of the most interesting jobs for which the bulldozer equipment is being used is in the moving of stone in large storage piles. When special sizes of stone are being produced, occasionally there is insufficient storage space in the recoverable storage and, in such cases, the tractor and bulldozing unit are used to move out a large quantity of stone to provide additional storage space. Later, when the special-size stone has been loaded into steamers, the unit is again employed to push the previously-moved stone back over the tunnels for loading out for shipment. This work was previously done by an electric gantry crane moving on fixed tracks, which necessarily had to be shifted from place to place as the occasion demanded.

Study Possibilities of North Dakota Shales

Experiments in the manufacture of cement from high-calcium shale found in the Pembina Mountains in North Dakota will be started this spring at the North Dakota School of Mines under the direction of William Budge, professor of ceramic engineering. Thirty years ago a plant for the making of cement from North Dakota shale was in operation near Concrete in Cavalier county.

Kansas Stone Producer Making Concrete Bricks

The Quartzite Stone Co. has just installed a new Dunbrik machine at its property at Lincoln, Kan. E. W. Forney is in charge of the new department and, shortly after installation, production was started on an order for 40,000 units to be used in a building project by the Soukup Produce Co. at Ellsworth, Kan.

Canadian Gypsum Adds Rock-Wool Facilities

Canadian Gypsum Co., Ltd., is installing in the former Roman Stone Co. plant, Toronto, Ont., which it recently purchased, equipment for large-scale production of rock wool. When completed the plant is to be one of the largest and most modern of its kind in Canada. Production is expected to begin about July 1.

Recent Equipment Installations ★ ★ ★

A Pangborn dust collector is being installed at the Le Gore, Md., plant of the Le Gore Lime Co. *** *A Bates packing machine and a Stedman pulverizer were recently placed in service at the lime plant of S. W. Barrick & Sons, Woodsboro, Md.* *** Waylite blocks are now being produced by the Illinois Concrete Tile Co., Mendota, Ill.

The Mt. Carmel Sand & Gravel Co., recently installed an 18-in. belt-conveyor at its Mt. Carmel, Ill., plant. The installation is 220 ft. long. *** *L. A. Warren & Co., Nashville, Tenn., are producing concrete joists with a new R&L Crescent machine, recently installed.*

Several electric motors have been added at the lime plant of John S. Hyde, Westminster, Md. *** *Direct-firing coal mills have been sold recently by the Babcock & Wilcox Co. to the following cement companies: Universal Atlas, Giant and Alpha.* *** The Great Eastern Gravel Corp., Port Jefferson, N. Y., has placed two 5-ft. by 16-ft. triple-deck vibrating screens in service. The screens were built by the Robins Conveying Belt Co.

The Lime & Hydrate Plants Co., York, Pa., has just shipped a Kuntz hydrate plant to the Cummer Lime & Mfg. Co., Ocala, Fla., and two gas-fired lime kilns and complete Kuntz system hydrate plant to Hawaiian Gas Products, Inc., Honolulu. Allen Renton is vice-president and general manager.

When the main highway was washed out in the recent southern California flood, the Triangle Sand & Gravel Co., San Bernardino, Cal., worked this Allis-Chalmers tractor and LeTourneau bulldozer day and night to build a temporary highway into Redlands so that material might be moved out by motor truck.

Federal Government Drastically Revises Cement-Buying Policies

Two important announcements were made recently by the Federal government with reference to revised policies on cement purchases.

The first announcement stated that hereafter the procurement division of the U. S. Treasury Department will enter into contracts for Portland cement required by all Federal activities for both departmental and field services, as well as cement necessary for construction contracts where the use of cement purchased under the Federal contract will result in economies to the government. All departments and independent establishments of the Federal government are forbidden, after the expiration of such contracts as may still be in existence, to purchase cement directly, since the new instruction is that the procurement division will purchase all cement necessary for Federal activities. Thus, there was created what in effect amounts to a cement pool.

The second announcement stipulates (1) that in advertising for bids for cement, the procurement division will require bidders to agree to enter into an "open contract", under which contractors on government work and contractors on other work for which the government supplies all or a part of the funds may purchase cement at the prices quoted to the government; (2) that bidders for the cement contract will be required to quote on the basis of delivery at the place of manufacture of cement; (3) that bidders will be required to certify that there has been no collusion with other bidders or prospective bidders in the preparation of their bids.

These new policies are items of intense interest to every producer of cement, concrete products and ready-mixed concrete. The "open contract" provisions reinforce the cement-pool features of the first announcement; further, not only may contractors on government work obtain cement from that pool, but also contractors on work in which Federal funds are only partially involved may purchase cement at the prices quoted to the government. For instance, a highway contractor on a Federal-aid highway project may now buy cement through the Federal government at prices quoted in open contracts to the government. Since the Federal government has been held by the Attorney General not to be subject to the discriminatory price provisions of the Robinson-Patman Act, the way is now open for the Federal government to obtain cement prices which are considerably lower than those accorded other users. This is not to suggest that cement manufacturers will follow such a policy, but apparently legal authority for it now exists.

As new evidence of the drive of the Federal government on the use of the basing-point system, cement manufacturers are now required to quote prices based on delivery to the Federal government at the point of manufacture. In other words, the Federal government will no longer accept delivered prices on cement. This, of course, is contrary to the policy employed by the cement industry for many years past, and unquestionably the new instructions from the Treasury Department are calculated to upset the basing-point system in the cement industry. The issue involved, however, goes far beyond the cement industry, since a precedent is here established which may lead ultimately to the purchasing of all materials on a "plant-price" basis by the Federal government. Furthermore, the requirement for quoting cement prices at the mill apparently means the complete elimination of the cement dealer in all Federal purchases of cement. Since the order also permits contractors on projects using Federal funds only in part to purchase cement at prices quoted to the procurement division, the elimination of the dealer will extend into many areas where Federal policy so far had not interfered.

Cement proposals were issued by the procurement division on March 30, and bids opened on April 15. Reflecting the new policy of the Federal government, the following stipulation which each bidder must sign is included:

"The undersigned represents that the prices in this bid are neither directly nor indirectly the result of any agreement with any other bidder."

Under the provision headed "Quotation of Prices," the following stipulation is made: "Bids are requested f.o.b. carrier at bidder's mill only . . ." Bids are to be accepted under this proposal for cement to be furnished to the Federal government from the period May 1, 1938, to August 31, 1938. While the procurement division does not undertake to furnish bidders an estimate of the quantity to be purchased from successful bidders, it is advised that the experience of Federal agencies for a comparable period indicates an approximate consumption of 3,000,000 bbl. However, the following information is furnished to bidders as to the use which may be made of the price which they quote for cement:

"In addition to purchases by government agencies for their own use under the proposed contracts, successful bidders shall furnish cement to any and all people and agencies using cement on, or supplying cement to, projects the construction of which is provided for, by contract or otherwise, subsequent to date of this contract and which are financed in whole or in part by the Federal government, at prices not to exceed those stated in the bid."

Walter A. Wecker, president of the Marquette Cement Mfg. Co. sent the following letter to the U. S. Treasury

Dept. on April 12 when it submitted its bid under the new requirements. Because it summarizes so well the difficulties imposed by the new orders and sets forth basic objections which are probably general throughout the cement industry, it is reprinted practically in full:

"We submit herewith and attach hereto a bid in response to your invitation of March 30, 1938, for supplying Portland cement for the period May 1, 1938 to August 31, 1938 inclusive. It is the best bid we can make under the limitations and restrictions imposed by your invitation.

"The larger difficulties confronting us under this proposal are: *first*, that it discloses nothing about the quantities of the various kinds of cement to be purchased nor the points of use thereof; *second*, you do not undertake to make actual purchase and to take actual delivery of even one barrel of the total you might award to a successful bidder; *third*, it appears to call for sales to you on classes of work in connection with which we have for years recognized the building-material dealer as a necessary and indispensible intermediate distributing medium. In years past the sale of 60 per cent. or more of our entire production has depended upon and been made through a dealer organization patiently built up at the expense of a very large sum of money and with considerable effort. We therefore ask you to consider that this dealer organization represents a very valuable part of our good will and that in connection with maintaining this good will and this important sales outlet, it has for many years been our definite general policy to stay out of the retail business and to confine our business to that of a wholesaler, dealing in minimum quantities of carload lots. We say this is our general policy despite the fact that we do meet the competition of other companies in a few places where such companies sell in less than carload lots and deliver by truck. Now, as stated, it appears that much of the cement contemplated to be purchased under this proposal in zones on which we are bidding is intended to be used in such small quantities and at such points remote from railroad sidings as have been handled in the past through building-material dealers. Thus, in making this bid, we are confronted with the very serious problem of departing from our long-established policy of selling through dealers wherever the situation requires service which the dealers are particularly equipped to furnish. Frankly, we are extremely loath to do anything which may result in antagonizing members of our dealer organization which constitutes the backbone and mainstay of our market for cement, and, therefore, we have been compelled to decide that we must qualify this proposal so as to work as little hardship as possible upon the building-material dealer and yet so that we come as close as possible to meeting the requirements of your invitation.

"With respect to quantities and points of use, we wish to point out that we could have made a much more intelligent bid if we had been furnished with information along these lines. Consistently, for many years past, it has been the policy of Marquette Cement Manufacturing Co. to bid f.o.b. mill prices to the U. S. Government where land-grant rates or barge shipments were involved, with the possibility of a resultant material saving to the Government by such bidding and by taking delivery at the point of shipment and shipping on Government bills of lading. As examples and as illustrations of what has been and what could be accomplished if such information were furnished, we cite you the attached list of f.o.b. mill quotations made by this company to the U. S. Government. Now, however, it appears that instead of adopting this policy, the Procurement Division has seen fit, by the provisions in the 'Conditions' submitted with the invitation, to adopt what may be fairly described as a destination cost-control clause. Certainly it is true that the cost of Portland cement at the point of use, that is, the destination, has been and will continue to be the controlling feature in making awards either upon Government or any other purchase contract. Thus the market place at which competition is required is at the point of use or destination. By the system of bidding in the dark evolved and set forth in your invitation to bid, it is not possible to procure constructive and money-saving competition. Lack of information as to any definite quantity to be purchased only accentuates this condition.

"In connection with your apparent position of not committing yourself to taking actual delivery of a definite amount of cement under a contract to be entered into following acceptance of this proposal, we ask you to appreciate the fact that without modification of this position, there would be introduced into our operating picture an element of uncertainty and speculation which we have never had to deal with before and which would appear to jeopardize or possibly seriously upset our production schedules, upon which the welfare of approximately 1,200 employees, their families and the small communities in which they reside, largely depend.

"Let us try to illustrate: The four months of your proposed contract period are the very months during which more than half of our total production for the calendar year is shipped. We start with our storage bins completely full and in order to run steadily through the ensuing fall and winter and not again fill our bins until the spring of the following year, we must adjust our operating schedule during the year so that we have empty storage bins at the end of the shipping season on November 1st. In other words, Portland cement must be produced and stored up long in advance of use. This, coupled with the fact that about 75 per cent. of our sales are made, too, long in advance of use, and that they are for specific work which we know definitely will result in shipments, makes our operations extremely sensitive to any speculation or uncertainty. If, under these circumstances, we accept an obligation to ship a specified amount of cement, we must set aside that much of our stock of finished cement. If it then does not move, we will have it left at the end of the shipping season and a shutdown of our mills will then become necessary during the following winter, because we can not make more cement than our bins will hold.

"Because of the necessity of making our committments as definite and certain as is reasonably possible, it has been necessary to qualify the provisions that will be included in the proposal and contract which are hereto attached and, together with this letter, made a part of our bid. It will be noted that we have stricken out the provision on page 6 of the 'Conditions' under which we would be required, in addition to any purchase by the Government, to furnish cement to any and all people and agencies using cement on, or supplying cement to, projects, the construction of which is provided for in any manner or in any part by Federal Government financing. Such additional indefinite and speculative obligation can not be undertaken for the various reasons already stated."

On April 21 Secretary Morgenthau announced that all the bids submitted under the proposals of March 30 had been rejected because "while 24 bids were submitted and there was evidence of competition, it was decided that it was decided that it was not to the government's interest to accept them".

National Crushed Stone Assn.
National Lime Assn.
National Slag Assn.
Portland Cement Assn.

WITH THE TRADE ASSOCIATIONS

National Sand & Gravel Assn.
National Industrial Sand Assn.
National Ready Mixed Concrete Assn.

MAY, 1938

Industrial Sand Assn. to Convene May 11-12

Plans are nearly complete for the annual convention of the National Industrial Sand Assn. to be held May 11 and 12 at Zanesville, O. Convention headquarters will be at the Hotel Rogge and sessions are scheduled to be held in the Zanesville art museum a short distance away.

Speakers on the program will include Theodore Hatch, associate dust-control engineer of the New York Department of Labor whose topic will be *Regulations for Dust Control in the Foundry and Ceramic Industries.* Dr. Roy Jones of the U. S. Public Health Service will speak on medical phases of the dust-control problem. V. P. Ahearn, executive secretary will discuss *The Political Scene in Washington.*

Issues Specifications on Lime-Cement Mortars

The National Lime Assn. recently issued specifications covering lime and lime-cement mortars for use in unit masonry and plans to mail these to architects throughout the United States in the near future. The specifications follow:

Lime Mortar—Lime mortar shall be prepared by thoroughly mixing one (1) volume of lime putty or one (1) volume of hydrated lime with not more than three (3) volumes of sand and sufficient clean water to produce a mass of approved consistency or the use intended.

Lime-Cement Mortar—Lime-cement mortar shall be prepared by thoroughly mixing two (2) volumes of lime putty or two (2) volumes of dry hydrated lime with one (1) volume of Portland cement and not more than nine (9) volumes of sand, adding sufficient clean water to produce a mass of approved consistency for the use intended.

Cement-Lime Mortar (for Use Below Grade)—Unit masonry below water level or constantly subjected to wet conditions should be laid up in mortar prepared by thoroughly mixing one (1) volume of lime putty or one (1) volume of dry hydrated lime with one (1) volume of Portland cement and not more than six (6) volumes of sand, adding sufficient clean water to produce a mass of approved consistency for the use intended.

Quicklime—Quicklime shall conform to the requirements of American Society for Testing Materials Standard Specifications for Quicklime for Structural Purposes, Serial Designation: C5-26. Pulverized quicklime shall be of such particle size that 100 per cent. will pass a 20-mesh sieve and not less than 90 per cent. will pass a 50-mesh sieve.

Hydrated Lime—Hydrated lime shall conform to the requirements of American Society for Testing Materials Standard Specifications for Hydrated Lime for Structural Purposes, Serial Designation: C6-31.

Portland Cement—Portland cement shall conform to American Society for Testing Materials Standard Specifications for Portland Cement, Serial Designation: C9-30. (Note: Slag, puzzuolan or other approved types of hydraulic cement may be substituted for Portland cement. Never substitute cement for lime.)

Sand—Sand for use in masonry mortar shall be clean, well graded and free from organic or other deleterious matter. It shall be composed of hard, durable grains, washed and screened with 100 per cent. passing a No. 4 sieve; at least 90 per cent. passing a No. 8 sieve; and not over 5 per cent. passing a No. 100 sieve.

Water—Only clean, clear water of potable quality shall be used in preparing masonry mortar.

Coming Events

May 9-11, 1938, Cincinnati, O. — Annual convention, National Lime Assn., Netherland Plaza Hotel.

May 11-12, 1938, Zanesville, O.—Annual meeting, National Industrial Sand Assn., Hotel Rogge.

June 27-July 1, 1938, Atlantic City, N. J.—Annual meeting, American Society for Testing Materials, The Chalfonte-Haddon Hall.

August 29-September 3, 1938, Grand Rapids, Mich. — Power Show and Mechanical Exposition, National Association of Power Engineers, Civic Auditorium.

Sept. 30-October 1, 1938, Urbana, Ill.—Sixth Annual Illinois Minerals Conference, University of Illinois.

October 10-14, 1938, Chicago, Ill. — National Safety Congress and Exposition, Stevens Hotel.

J. E. Dunn Is Appointed PCA District Engineer

The appointment of J. E. Dunn as district engineer of its Richmond, Va. office, with supervision over the work in Virginia and North Carolina, has just been announced by W. M. Kinney, general manager of the Portland Cement Assn. He succeeds H. D. Humphries, resigned, and came to the association in 1925 as field engineer in Tennessee. He was appointed district engineer of the Nashville, Tenn. office in 1929, remaining in that position until the office was closed in 1931. Since then he has continued as the association's field representative in Tennessee.

Mr. Dunn is a graduate of Purdue University where he obtained a degree in electrical engineering in 1920. In 1923 he received a degree in civil engineering from Vanderbilt University.

In 1923 he was with the Kentucky Department of State Roads and Highways as a junior engineer and was with the Tennessee Department of Highways and Public Works in 1924 as Plans Engineer.

Associations Coöperate on Ready-Mix Promotion

In his address before the National Ready Mixed Concrete Assn. at Cincinnati, O., W. D. M. Allan, director of promotion of the Portland Cement Assn., spoke on developing the ready-mixed-concrete market. He also told of the many requests for merchandising assistance the association had received from ready-mixed operators and offered to coöperate with the ready-mixed association as folows:

1. In the preparation of a series of eight or ten letters which could be used as the basis for developing local sales.

2. The preparation of booklets or circulars promoting the use of ready-mixed concrete.

V. P. Ahearn, executive secretary, has just written Mr. Allan advising that the ready-mixed association wants to go ahead with the two projects and some effective aids in merchandising ready-mixed concrete are expected to be available before long as a result.

EDITORIAL

Popular Economic Fallacies

THE field of human knowledge is so wide and the range of human misunderstanding nevertheless so great that one could easily, if given the time, enumerate thousands of misconceptions which, despite the spread of scientific research and discovery and the rapid diffusion of information, afflict and hamper most people who try to be well-informed and to form their opinions intelligently. Such a task of enumeration is made simple by the fact that for every scientific truth brought to light many pseudo-scientific untruths appear to befuddle the mind by innocent or deliberate distortion, evasion, innuendo and invention. Our ignorance is still vastly greater than our knowledge.

In the sphere of economics, wherein the scientific method is only beginning to show the kind of important results that have followed its use in other fields, knowledge is anything but widespread. In some of our largest universities students are still being introduced to economics through textbooks written by men who do not yet realize the necessity of approaching their subject by the method of scientific analysis. Why should we wonder, then, if mature business men, many of whom, like the average man in other walks of life, have had no training in economics, should be the victims of false conceptions regarding not only the relationship between economics and business and other branches of sociology but the very nature of the subject itself?

To most business men of our day and to an even greater extent among average "men on the street" economics is a new topic. It has been brought to their attention, if at all, probably through the columns of their daily newspapers, where it has been treated with as little understanding as one might reasonably expect it to receive at the hands of men who are not trained in the subject. These writers and editors are often themselves the victims of pseudo-economic propaganda issued by groups that have special interests to be served, and they merely rewrite and redistribute — sometimes in badly garbled form — the special pleadings that cross their desks. The more popular these messages — the more they appeal to the prejudices and traditional views of themselves and their readers — the more certain they are to be disseminated and the more certain they are to increase the misunderstanding which surrounds the subject. When these views are colored by political partisanship in addition to pecuniary bias, they constitute one of the most dangerous forms of misinformation to which the fact-hungry reader is exposed.

While knowledge is still in such a formative stage and there is still time to prevent too great an influx of erroneous ideas, it may be interesting to mention a few of the misconceptions that are widely held by many business men and others who with respect to the immediate problems of their daily work insist upon incontrovertible evidence and visual proof of the statements upon which they are expected to base their judgments and their actions. The list will be short, since this is not intended to be a catalog of errors in human judgment, and it will be confined to some of the most important of the many problems that confront business men and workers, consumers and the agents of government. These fallacies will be presented without any attempt at systematic arrangement as regards their interrelationships or to evaluate them in relative importance. Some of the most common of them follow:

THAT business and economics are the same thing.

That a "theorist" is an economist who has either chosen not to enter business or, having entered it, failed to amass a fortune and, so, is not to be trusted by "practical" men.

That university professors are incompetent witnesses when brought forward in support of social and economic reforms but are worthy of the utmost respect and confidence when they argue against them.

That business men are powerless to influence the trend of economic events.

That economic crises are inevitable and that it is futile to try to avoid them by studying their causes and seeking to mitigate their effects.

That there is a single cause for our economic ills — a single group, a single person, a single idea responsible for our troubles.

That the achievements of this country in the economic field are due solely to a single cause — a benevolent government or political party, an all-wise administrator, individual initiative, the unrestricted action of a free people, and the like.

That prosperity is a natural condition — a sort of "state of nature" — that will automatically return and remain, if men will but sit back and let "natural" causes operate without human interference.

That every man knows what is best for himself and that, if left to his own choice of activities and conduct, he will make the greatest contribution to general economic welfare.

That industry, although created by man, should be his master rather than his servant, that it should control his destiny instead of being regulated by his requirements of service to him.

That technological unemployment is a myth, the invention of "quack" economists.

That the spread of economic diseases, such as unemployment, can be cured by isolating the patients and denying them treatment.

That a large parasitic class of unemployed poor is less dangerous to national well-being than a small parasitic class of idle rich.

That all business is dangerous and that its danger increases as it grows in size.

That the general price level can be raised faster than the general wage level without destroying prosperity.

That the wages of labor can be raised indefinitely without regard to the prices obtainable for the products of labor.

That the present distribution of wealth, as between the so-called "haves" and the "have-nots", has been ordained by some supernatural agency and is not, therefore, a subject open to scrutiny by human eyes or to investigation by human minds.

That the relationships of business — those between employer and employee, seller and buyer, competitors, consumers and government — can remain what they were or what we would like them to be, while every form of life, every other kind of human activity, even human nature and the very world in which we live are constantly undergoing change.

That somewhere in the undated past someone of unknown identity designed and brought into use the present economic system, which represents the final expression of human ingenuity and human adaptability and must, therefore, continue without improvement or other alteration to the end of time.

That a readiness to improve one's product, the methods of making it, and the ways of selling it manifests a high degree of intelligence and a remarkable freedom from prejudice and slavery to tradition, while a willingness to admit that there may likewise be ways in which the present economic order might be bettered and its conflicts softened stamps one as impractical and Utopian.

That the sole test by which any policy of business or government should be judged are the effects that result immediately or that affect immediately any particular group of competitors, customers, or other citizens.

That prior to the advent of the present government in Washington we prospered under a system of free competition, when, as a matter of economic historical fact it can not be shown that a freely competitive system has ever existed anywhere.

That a government must necessarily and unavoidably be either right or wrong in everything it does depending upon which political party dictates its policies and without regard to the long-run effects of its actions on national well-being.

That a day-by-day watching of the stock-market provides a worth-while index to the economic stability of the country.

That the curve of industry's production must always point upward, and that a downward trend, however short in duration, is reason for alarm.

That a nation can be prosperous when the great majority of its families earn barely enough for physical sustenance.

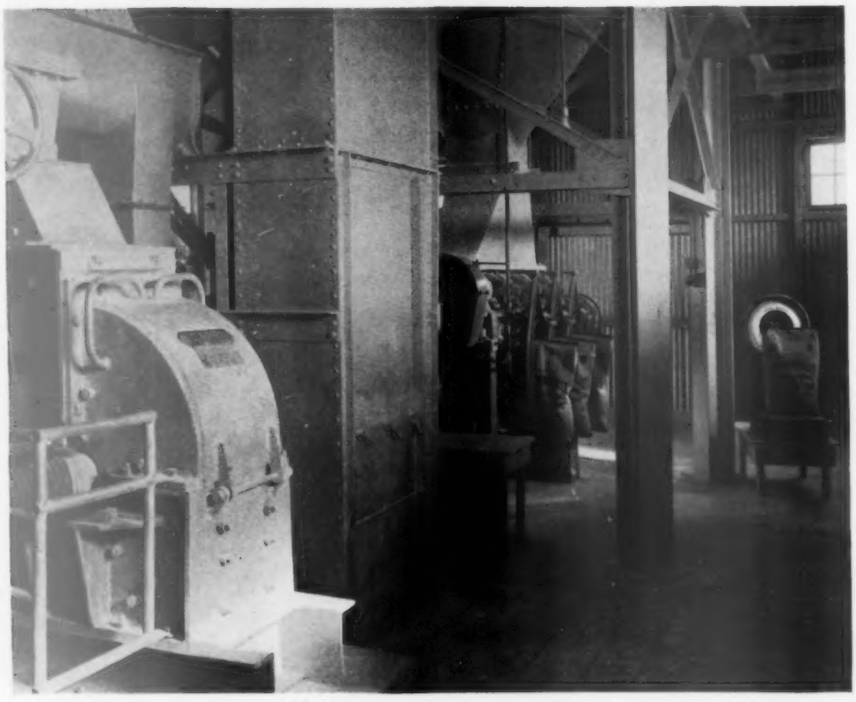
That a country's industries can be actively and profitably employed unless the desire to possess the products of their factories is convertible into action by the financial ability to buy them.

That the economic security of the country and its economic future are matters of concern only to business men.

That the men who write the financial columns in the newpapers, all those who venture to discuss social and economic problems, and ordinary stock-market tipsters are by those activities automatically qualified to rank as genuine economists.

That men who are engaged in academic work and devote their lives to economic study, research and training are thereby necessarily incapacitated for giving advice in economic problems of national interest and effect.

BRIEF as this list is it carries evidence of the great need for more dependable sources of information, less partial interpreters of facts, and higher standards of honesty on the part of those who have set themselves up as professional spreaders of learning. These are days when men of every economic status and every political group attachment need access to the truth without the freely-offered but not wholly disinterested meddling of those who plead for select political, economic, and social groups. Until some such access is made available to increasingly large numbers of people it will be easy to fill reams of paper with lists of popular social and economic fallacies. And until that time arrives democracy will not have fully justified itself as an efficient tool of a nation anxious to be well-informed as well as well-fed.



Exterior and interior views of the new building for producing ground lime for agricultural use, Thomasville Stone & Lime Co., Thomasville, Pa.

sary. Its close proximity to the hydrate building is advantageous further in that it allows the new plant to function as an auxiliary hydrate-packing unit, should the need arise, and it is actually so designed.

The new plant comprises in general a grinding mill, an elevator, a loading bin and packer, all compactly grouped and housed in a corrugated-steel shed. On the top floor of the adjacent hydrate plant a 10-ton raw-lime bin is charged by a vertical elevator from a crusher below. By inserting a second chute in the conical bottom of this bin, it has been made to serve both plants. From it raw lime is conveyed through a gravity chute and a screw-conveyor to the grinding mill of the new plant, from which it is discharged into the elevator boot and carried aloft to the loading bin, thence to the 3-tube packer below.

Consideration has been given to the possible future need of an air-separator with a storage bin for the fines, and space has been provided therefore. Should these appurtenances and the larger, outside storage bin be added, the elevator of the present installation would serve them all.

As mentioned above, the installation is usable also for packing hydrate. The feed end of the screw-conveyor is so located that it may be charged with hydrate from the bin directly above it, the gate in the raw-lime chute being closed. For this operation the circular slide gate in the screw-conveyor directly above the grinding mill is also closed, so that the hydrate by-passes the mill and is discharged directly into the elevator hopper, thence aloft to the loading bin.

Because of this dual function, both the screw-conveyor and the elevator

ADDS GROUND, BURNED-LIME FACILITIES

IN line with the sustained policy of plant improvement initiated several years ago by General Manager E. E. Cooke, the Thomasville Stone & Lime Co., Thomasville, Pa., has added a new function, the manufacture of ground burned lime.

Standing just south of the company's hydrate plant—itself a comparatively new unit, having been built only two years ago—the new installation appears from every angle to be admirably located. At one end there is economic access to a source of raw-lime supply, at the other direct contact with railroad and highway, and beside it open ground available for future storage bins when and if necessary. Its close proximity to the hydrate building is advantageous further in that it allows the new plant to function as an auxiliary hydrate-packing unit, should the need arise, and it is actually so designed.

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Because of this dual function, both the screw-conveyor and the elevator are somewhat larger than would have been necessary for burned lime only. They were proportioned so that the required capacity of 10 tons per hr. of burned lime would not be reduced for the lighter hydrate.

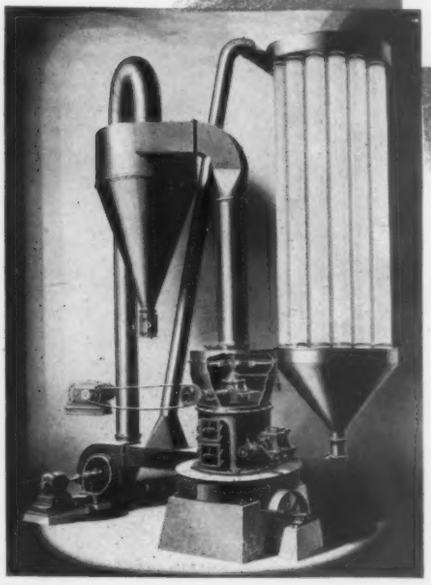
The mill is an Allis-Chalmers Pulverator, driven by a 40-hp. motor

(Continued on page 63)

Pit and Quarry Special

LIME SECTION

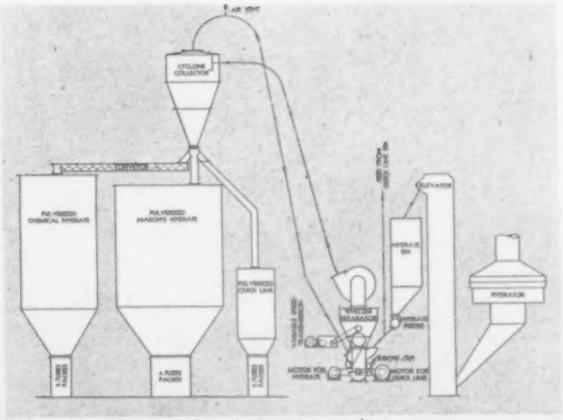
MODERN... LIME PRODUCTION By RAYMOND



GRINDING QUICKLIME — For large capacity and fine product at low cost, the Raymond Roller Mill with whizzer separator is recommended. Any grade from 50 to 200 mesh material can be obtained simply by changing the speed of the whizzer. The Roller Mill is equally efficient for pulverizing limestone and burnt lime. For smaller capacities and extreme fineness, the combination Automatic Pulverizer is used for handling both quicklime and hydrate as shown in the flow sheet.

Raymond machines are recognized as standard equipment in the lime products field. New developments in pulverizing and separating methods, introduced by Raymond engineers, have enabled producers to improve the quality of their finished material and reduce manufacturing costs. Today, many leading lime plants are Raymond equipped, and others are being modernized with the latest types of Raymond machines.

SEPARATING HYDRATED LIME — Today's demand for high purity chemical hydrate has necessitated a radical improvement over usual methods of production. This is supplied by the Raymond Automatic Pulverizer with whizzer separator. Producers using this equipment are able to get any range of fineness, from agricultural lime up to superfine chemical hydrate, testing 99.5% passing 400-mesh. The diagram shows a typical Raymond installation for the production of mason's hydrate, chemical lime and quicklime.



Write for information—you will find Raymond experience helpful to you in special lime production problems.

RAYMOND PULVERIZER DIVISION

COMBUSTION ENGINEERING COMPANY, INC.
1321 North Branch Street CHICAGO

Sales offices in Principal Cities . . . In Canada: Combustion Engineering Corporation, Ltd., Montreal

The Westvaco Chlorine Products Corp. plant at Newark, Cal., as seen from the air. In the foreground the barges that bring oyster shells from San Francisco Bay; behind them the storage and barge-unloading gantry; In the center the magnesia separating and washing tanks, the additive settling and decanting tanks and the lime-storage bins; toward the right the magnesia kiln and the lime kiln. In the background the lime-hydrating building at the left, the magnesia-shipping building and the products-storage bins in the center, the bulk-gypsum storage building at the right.

By W. E. TRAUFFER

Lime, Gypsum and Magnesite Produced from Sea Water and Shells at New Plant in California

ALTHOUGH many strange and wonderful things have come out of the sea, few of these have been of more than passing interest to producers of nonmetallic minerals. But when lime, gypsum and magnesite are produced from sea water and oyster shells in commercial quantities that's another story. This is just what is being done in the new plant of the Westvaco Chlorine Products Corp. at Newark, Cal., which went into operation in November, 1937. Lime and Portland cement have been made from oyster shells for many years and the production of salt through the evaporation of sea water is a long-established industry. The manufacture of magnesia from salt water and lime is comparatively new, but the manufacture of magnesite refractories and gypsum from them in commercial quantities is new.

This new plant is a combination of chemical and metallic- and nonmetallic-mineral plant operating methods. Much of the equipment used was made to order.

The plant's location, 1½ mi. west of Newark and 25 mi. south of Oakland, is an ideal one. The two chief raw materials — bittern from adjacent salt operations and shells from deposits in San Francisco Bay—are available in large quantities and at low cost. Both main-line railway and deep-water transportation are near at hand, and fuel oil, gas and electricity are cheap. Ample fresh water for process use is obtained on the property.

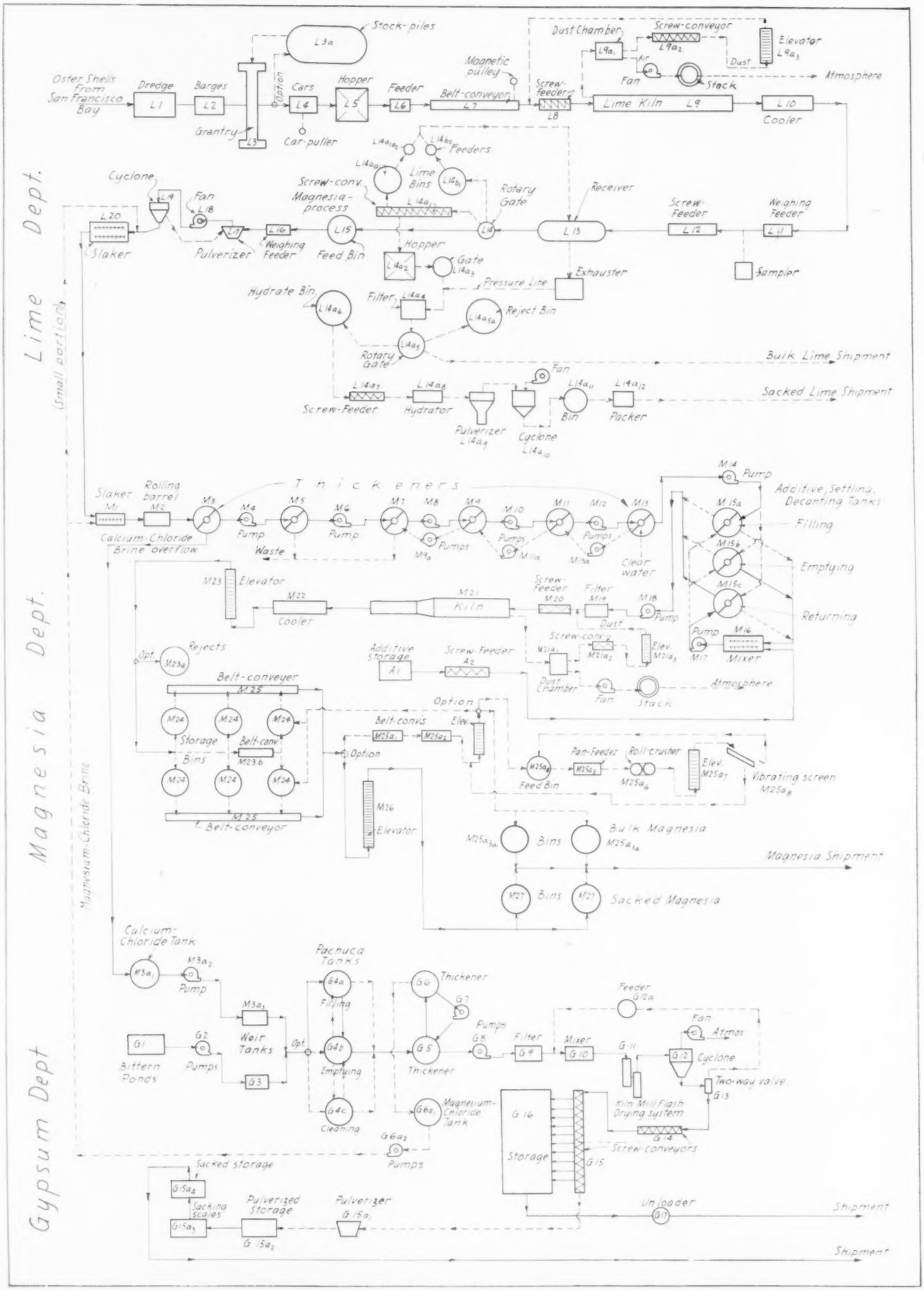
The availability of raw materials, fuels, etc., has been an important factor in the successful development of these properties. The history of these developments in California is long and involved, but during the 8 years since the first pilot plant was built, there has been little change in the operating and research personnel. This new plant is the result of continuous experimentation and development during that period.

This history began in 1920, when the National Kellastone Co., then the largest user of magnesite, formed the Sierra Magnesite Co., under whose name plants and properties were acquired at Porterville, Cal. This venture proved successful and it was then decided to enter other branches of chemical manufacture. In 1923 the California Chemical Corp. was formed and a plant built at Chula Vista, Cal., for the production of magnesium chloride, bromine and other materials from sea water. In 1926 a similar plant was built at San Mateo on the west side of San Francisco Bay and this was operated until 1929, when the present location at Newark was secured and a new bromine and magnesium-chloride plant was built. Late in 1930 a new rotary-kiln lime plant was built at Newark and this was described in the November 18, 1931 issue of PIT AND QUARRY. In 1932 the Sierra Magnesite Co. opened a new magnesite-calcining plant and a grinding plant near Gustine, Cal., both of which were described in the April, 1937 issue of PIT AND QUARRY.

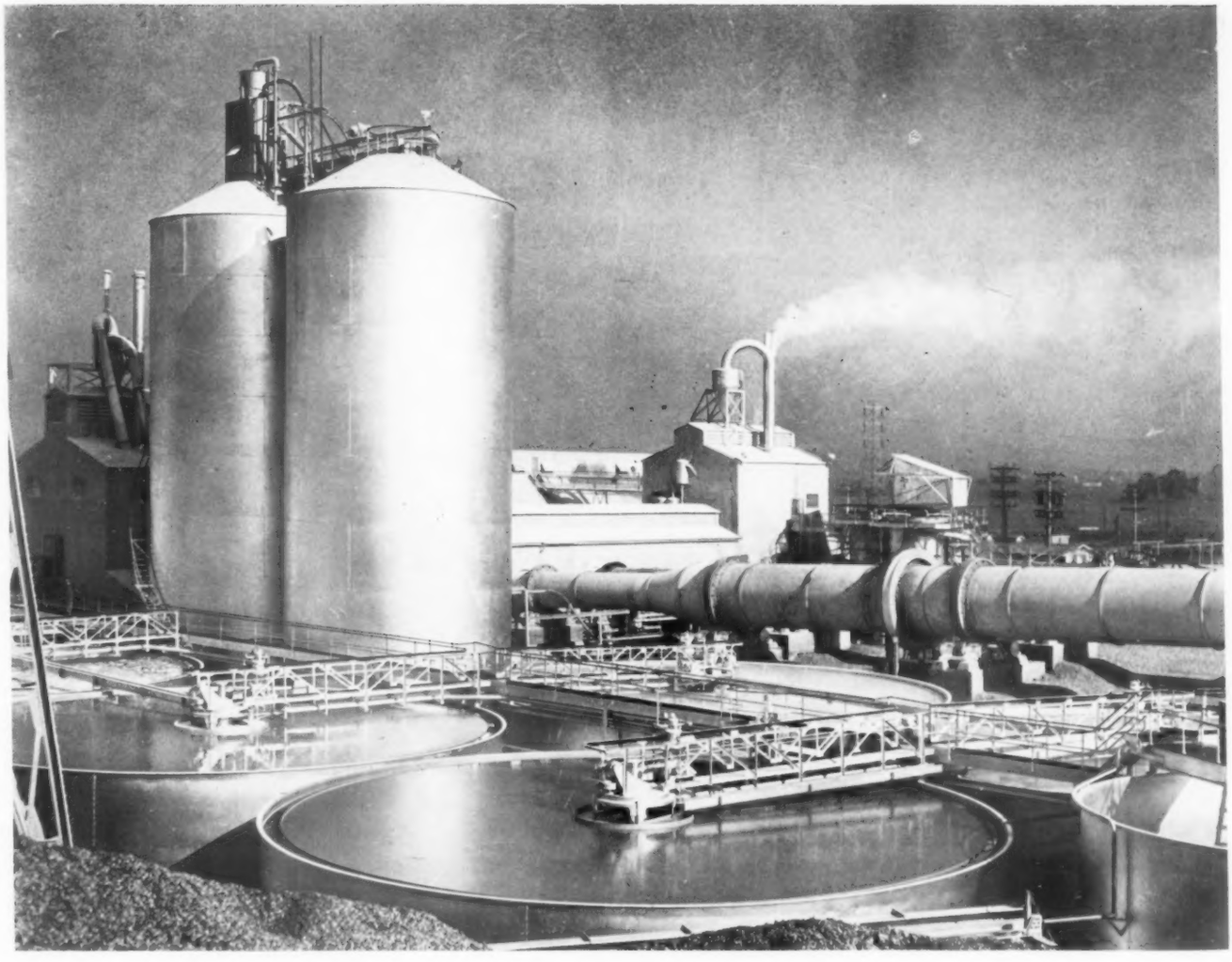
In 1933 United Chemicals obtained a large interest in these three firms and in 1934 the California Chemical Corp. and the Sierra Magnesite Co. were merged to form the California Chemical Co. Early in 1937 this company was taken over by the Westvaco Chlorine Products Corp. of which it is now a subsidiary.

Construction of the new plant was begun on February 15, 1937, and as construction progressed the old rotary-

Another airplane view of the Westvaco plant. Gypsum Pachuca tanks in the center foreground with the gypsum storage building at the right. In the center are the lime and magnesia kilns, the additive tanks and lime bins, and at the right the hydrating building and magnesia-products bins. In the background are the shell storage and gantry and, at the right, the fuel-oil storage tanks.



Flow-sheet of the Newark plant of the Westvaco Chlorine Products Corp.



The two 1,400-ton lime-storage bins, with the receiver of the pneumatic lime-conveying system at the top of one; the magnesia kiln; some of the wash thickener tanks in the foreground.

kiln lime plant which it replaced was torn down. Only the hydrating department was retained for the production of commercial hydrate. Tests made in the old plant during almost six years of steady operation were an important factor in governing the design of this new plant.

Raw bittern is obtained from local salt plants and during their summer salt-making season is impounded near the plant in ponds holding 100,000,000 gal. This storage is drawn upon throughout the year. It is expected that as long as salt is made in California an ample supply of bittern will be available. Long-term contracts with the major salt manufacturers in this district insure a continuous supply of bittern, which only a few years ago was considered a waste product.

The oyster-shell beds available are regarded by geologists as practically inexhaustible. The native California oyster inhabited this section for centuries and left deposits of shells extending from the Golden Gate throughout the entire inland lagoon known as San Francisco Bay and back on the shore as far as the first major range of hills. In some places these beds are 40 ft. or more in depth, lying in layers separated by strata of mud and other *débris*.

This plant has a daily capacity of 100 tons of fast-slaking quicklime, 90 tons of gypsum, and 60 tons of magnesia products. About 75 tons of the quicklime produced daily is used in the plant to precipitate magnesia from the salt-water bittern. The remaining 25 tons is sold as quicklime or hydrated lime. The Pacific Portland Cement Co. has contracted for most of the gypsum output and the remainder is sold for various purposes.

The hydrated lime has a fineness of 98.5 per cent. through 325-mesh and is particularly suitable for use in paper manufacture, for water treatment, and chemical processes. Experiments are being made to determine the possibility of making dolomitic lime by the addition of quicklime to the magnesia sludge in the magnesia kiln.

The magnesia products cover a wide range. They include a light-burned, reactive "C"-grade magnesite; a chemical oxide used for chemical purposes; an oxychloride-cement grade; a dead-burned magnesite used as an open-hearth refractory; a No. 90 periclase used in the manufacture of refractory bricks; a No. 93 periclase containing over 93 per cent. MgO for special high-temperature purposes. Only one grade can be produced at a time. It is claimed that a double-burned roasted dolomite for use as an open-hearth refractory can also be made with the high kiln temperatures employed.

The periclase produced in this plant differs only in minor details from that product made from mined magnesite and is used for the same purposes. Should the existing deposits ever be worked out, it is believed that this artificial product can be produced in sufficient quantities to meet all demands. This product is from 97 to 98 per cent. pure and by adding various ingredients alone or in combination be-

FLOW-SHEET AND TABULAR ANALYSIS OF THE OPERATIONS AND EQUIPMENT OF THE WESTVACO CHLORINE PRODUCTS CORP. PLANT, NEWARK, CAL.—PART I.

LIME DEPARTMENT

Operation	Key No.	Equipment	Make	Model No., Size Capacity or Type	Electric Motors	Power Transmission
Oyster-Shell Recovery, Delivery, Storage and Feeding	L1	Dredge				
	L2	Barges (From L2 or L3a)				
	L3	Crane, Gantry	Pacific	8-ton, 90-ft. gage, 300-ft. span	107 ½-hp. (total)	
		Bucket, Clam-shell (To L3a or L4)		5-cu. yd.		
		(From L3)				
	L3a	Stock-pile (To L3)		10,000-ton		
		(From L3)				
	L4	Cars (3)		200-cu. yd. bottom discharge		
		Car-puller	Novo	2-drum	7½-hp. U.S.	Falk reducer
	L5	Hopper		Track, 100-cu. yd.		
	L6	Feeder	Link-Belt	Reciprocating	2-hp. U.S.	Gear and pinion
	L7	Conveyor	Link-Belt	Belt, 18-in. by 140-ft. inclined, Goodyear		
		Pulley	Dings	Magnetic		
		Motor-generator (Dust from L9a3)			2-hp.	
	L8	Feeder	Link-Belt	Screw, water-jacketed, retractable	5-hp. U.S.	Falk reducer
Lime Calcining, Cooling and Conveying	L9	Kiln (Lime to L10, dust to $L9a_1$)	Traylor	Rotary, 7½-ft. by 315-ft., all-welded	50-hp. U.S.	Falk reducer
	L10	Cooler	Traylor	Rotary, 5-ft. by 50-ft.	10-hp. U.S.	Falk reducer
	L11	Feeder	Parsons	Weighing, 50 lb. per dump		
		Sampler	Link-Belt	Bucket, 1-per cent.	½-hp. U.S.	U.S. reducer
	L12	Feeder	Link-Belt	Screw	2-hp. U.S.	Falk reducer
Quicklime Storage, Feeding, Pulverizing, and Slaking		(From L12)				
	L13	Receiver	Fuller	Two-stage		
		Exhauster	Fuller	Airveyor	50-hp. motor	
	L14	Gate (To L15, $L14a_1$, or $L14b_1$)		Rotary		
	L15	Bin, Magnesia-Process Supply		100-ton steel		
	L16	Feeder	Parsons	Weighing, adjustable		
	L17	Pulverizer	Raymond	No. 1 automatic-throwout	25-hp. U.S.	Texrope V-belt
		Separator	Raymond	No. 5 Whizzer	7½-hp. U.S.	U.S. Varidrive
	L18	Fan	Raymond	No. 8 L	25-hp. U.S.	Direct-connected
	L19	Cyclone (Magnesium-chloride brine from $G6a_2$)	Raymond	6-ft. diam.		
	L20	Slaker (To M1)		Double-paddle	10-hp. U.S.	U.S. Varidrive
Lime Handling and Feeding		(From L14)				
	$L14a_1$	Conveyor (To $L14a_2$ and $L14a_1a_1$)		Screw		
	$L14a_2$	Hopper, Lime				
	$L14a_3$	Gate		Air-locking		
	$L14a_4$	Filter	Fuller	Airveyor	½-hp. motor	
	$L14a_5$	Gate (To $L14a_6$, or $L14a_5a$ or to cars in bulk)		Rotary		
Commercial-Lime Storage, Hydrating, Packing, and Shipping	$L14a_6$	Bin, Hydrate		100-ton steel		
	$L14a_7$	Feeder	Link-Belt	Screw	1½-hp. U.S.	U.S. Varidrive
	$L14a_8$	Hydrator	McGann	Schulthess continuous, 2½-ton per hr.	7½-hp. U.S.	De Laval worm-gear reducer
	$L14a_9$	Pulverizer	Raymond	No. 1 automatic-throwout	7½-hp. U.S.	V-belt
		Separator	Raymond			
	$L14a_{10}$	Cyclone	Raymond		2-hp. U.S.	
		Fan				
	$L14a_{11}$	Bin			1-hp. U.S.	
		Shaker, Dust				
	$L14a_{12}$	Bag-packer (To cars)	Bates	2-spout	10-hp. U.S.	
Waste Disposal		(From $L14a_5$)				
	$L14a_5a$	Bin, Rejects (To waste)		14-ton steel		

(Continued on page 47)

FLOW-SHEET AND TABULAR ANALYSIS OF THE WESTVACO CHLORINE PRODUCTS CORP. PLANT, NEWARK, CAL.—PART II.

MAGNESIA DEPARTMENT—I

Operation	Key No.	Equipment	Make	Model No., Size Capacity or Type	Electric Motors	Power Transmission
Lime and Magnesium - Chloride Brine Mixing		(Magnesium-chloride brine from Gbag, milk of lime from L20)				
	M1	Slaker		Single-paddle	10-hp. U.S.	Falk reducer
	M2	Rolling Barrel	Traylor	10-ft. by 36-ft.	15-hp. U.S.	Falk reducer
Magnesium-Hydrate and Calcium-Chloride Brine Separation	M3	Thickener Separator Agitator (Calcium-chloride overflows to M3a), magnesium hydrate to M4)	Dorr	55-ft. diam. by 12-ft. Mechanical-rake	3-hp. U.S.	Falk reducer and roller chain
	M4	Pump (Liquid from M7a, sludge from M4)	Oliver-Sabin	4-in., 75-gal. per min.	Vacuum pump	
	M5	Thickener Agitator (Overflow to waste, product to M6)	Dorr	55-ft. diam. by 12-ft. Mechanical-rake	3-hp. U.S.	Falk reducer and roller chain
	M6	Pump	Oliver-Sabin	4-in., 75-gal. per min.	Vacuum pump	
Magnesium-Hydrate Washing		(Liquid from M9a, sludge from M6)				
	M7	Thickener Agitator (Overflow to waste, product to M8)	Dorr	55-ft. diam. by 12-ft. Mechanical-rake	3-hp. U.S.	Falk reducer and roller chain
	M8	Pump	Oliver-Sabin	4-in., 75-gal. per min.	Vacuum pump	
	M9	Thickener Agitator (Overflow to M9a, product to M10)	Dorr	55-ft. diam. by 12-ft. Mechanical-rake	3-hp. U.S.	Falk reducer and roller chain
	M9a	(From M9) Pump, Counter-current (To M7)	Sterling	Centrifugal		
	M10	Pump	Oliver-Sabin	4-in., 75-gal. per min.	Vacuum pump	
	M11	Thickener Agitator	Dorr	55-ft. diam. by 12-ft. Mechanical-rake	3-hp. U.S.	Falk reducer and roller chain
	M11a	(From M11) Pump, Counter-current (To M9)	Sterling	Centrifugal		
	M12	Pump	Oliver-Sabin	4-in., 75-gal. per min.	Vacuum pump	
	M13	Thickener Agitator (Overflow to M13a, product to M14)	Dorr	55-ft. diam. by 12-ft. Mechanical-rake	3-hp. U.S.	Falk reducer and roller chain
	M13a	(From M13) Pump, Counter-current (To M11)	Sterling	Centrifugal		
	M14	Pump (To M15a, b, or c)	Oliver-Sabin	4-in., 75-gal. per min.	Vacuum pump	
Magnesium-Hydrate Sludge Storage		(From M14 and M17)				
	M15a	Tank, Additive Agitator	Dorr	30-ft. diam. Mechanical, revolving	5-hp. U.S. (3)	Gates V-belts
	M15b	Tank, Additive Agitator	Dorr	30-ft. diam. Mechanical, revolving	5-hp. U.S. (3)	Gates V-belts
	M15c	Tank, Additive Agitator (Sludge to M16, mixture to M18)	Dorr	30-ft. diam. Mechanical, revolving	5-hp. U.S. (3)	Gates V-belts
Powder Additive	A1	Additive Storage				
	A2	Feeder (To M16)	Link-Belt	Screw, 9-in. by 10-ft.	2-hp. U.S.	U.S. Varidrive
Sludge and Additive Mixing and Transportation		(From M15a, b or c)				
	M16	Mixer		Horizontal double-paddle	10-hp. U.S.	Falk reducer
	M17	Pump (To M15a, b or c)	Oliver-Sabin	6-in., 150-gal. per min.	Vacuum pump	

(Continued on page 48)

FLOW-SHEET AND TABULAR ANALYSIS OF THE WESTVACO CHLORINE PRODUCTS CORP. PLANT, NEWARK, CAL.—PART III.

MAGNESIA DEPARTMENT—II

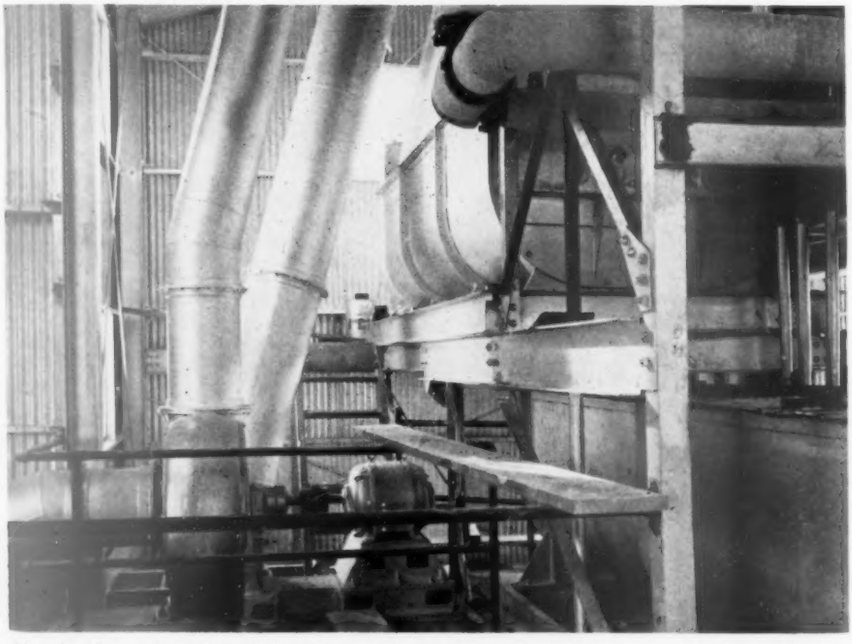
Operation	Key No.	Equipment	Make	Model No., Size Capacity or Type	Electric Motors	Power Transmission
Prepared Sludge Filtering		(From M15a, b or c)				
	M18	Pump	Oliver-Sabin	4-in., 75-gal. per min.	Vacuum pump	
	M19	Filter	Oliver-Sabin	Cloth drum, 8-ft. by 12-ft.	1-hp. U.S.	U.S. Varidrive
Magnesia Feeding and Calcining		(From M19 and M21a3)				
	M20	Feeder	Link-Belt	Screw, water-jacketed	7½-hp. U.S.	Falk reducer
	M21	Kiln	Traylor	Rotary, 11-ft. and 7-ft. by 190-ft., all-welded	100-hp. U.S.	Falk reducer
		(Magnesia to M22, dust to M21a1)				
Magnesia Cooling, Storage and Reclamation	M22	Cooler	Traylor	Rotary, 6-ft. by 60-ft.	20-hp. U.S.	Falk reducer
	M23	Elevator	Link-Belt	Bucket, 110-ft.	5-hp. U.S.	Falk reducer
		(To M24, M23a, or M23b)				
		(From M23)				
	M23a	Bin, Rejects				
		(To waste)				
	MM23b	Conveyor	Link-Belt	Belt, 16-in. by 30-ft., Goodyear belt	1-hp. U.S.	Falk reducer
		(From M23 and M23b				
	M24	Bins (6)		500-ton, conical-bottom		
	M25	Conveyors (2)	Link-Belt	Belt, 16-in. by 45-ft.	1-hp. U.S. (2)	Falk reducer
		(To M26 or M25a1)				
Magnesia Loading		(From M25)				
	M26	Elevator	Link-Belt	Bucket, 90-ft.	5-hp. U.S.	Falk reducer
	M27	Bins (2)		100-ton		
		(To cars for shipment in bulk or bags)				
		Car-spotter	Link-Belt		5-hp. U.S.	
Magnesia Transportation, Crushing and Screening		(From M25)				
	M25a1	Conveyor	Link-Belt	Belt, 16-in. by 45-ft., Goodyear belt	1-hp. U.S.	Falk reducer
	M25a2	Conveyor	Link-Belt	Belt, 16-in. by 45-ft., Goodyear belt	1-hp. U.S.	Falk reducer
		(From M25a2 and M25a8)				
	M25a3	Elevator	Link-Belt	Bucket	5-hp. U.S.	Falk reducer
		(To M25a4, M24 or M25a3a)				
	M25a3a	Bins (2)		100-ton		
		(From M25a3 and M25a8				
	M25a4	Bin		60-ton		
	M25a5	Feeder	Link-Belt	Pan, 17-in. by 5-ft.	¾-hp. U.S.	Falk reducer Belt
	M25a6	Crusher	Traylor	Double-roll, 14-in. by 30-in. diam.	20-hp. U.S.	
	M25a7	Elevator	Link-Belt	Bucket, 35-ft.	2-hp. U.S.	Falk reducer
	M25a8	Screen	Link-Belt	Vibrating, 3-ft. by 5-ft., single-deck	2-hp. U.S.	Gates V-belts
		(Oversize to M25a4, fines to M25a3)				
Calcium-Chloride Storage and Feeding		(From M3)				
	M3a1	Tank		½-day capacity		
	M3a2	Pumps (2)	Ingersoll-Rand		5-hp. U.S. (2)	
	M3a3	Weir Tank				
		Meter	Taylor	Fulscope 300-gal. per min.		
		(To G4a, b or c)				

(Continued on page 49)

FLOW-SHEET AND TABULAR ANALYSIS OF THE WESTVACO CHLORINE PRODUCTS CORP. PLANT, NEWARK, CAL.—PART IV.

	Operation	Key No.	Equipment	Make	Model No., Size Capacty or Type	Electric Motors	Power Transmission
GYPSUM DEPARTMENT	Raw Bittern Storage and Feeding		(From salt plants)				
		G1	Ponds				
		G2	Pumps (2)	Sterling		5-hp.	
		G3	Weir Tank				
			Meter	Taylor	Fulscope 300-gal. g.p.m.		
			(To G4a, b or c)				
	Calcium-Chloride and Bittern Storage and Mixing (Typical flow)		(From M3a3 & G3)				
		G4a	Tank		Pachuca, conical-bottom, air-agitated		
		G4b	Tank				
			(To G5)				
		G4c	Tank				
			Pump, Transfer		On hoist	1½-hp. U.S.	
	Gypsum and Magnesium-Chloride Separating and Storage		(From G4a, b or c and G7)				
		G5	Thickener, Primary		55-ft. diam. by 12-ft.		
			Agitator, Mechanical	Dorr	Rake	3-hp. U.S.	Falk reducer and roller chain
			(Overflow to G6, solids to G8)				
			(From G5)				
		G6	Thickener, Secondary		55-ft. diam. by 12-ft.		
			Agitator, Mechanical		Rake	3-hp. U.S.	Falk reducer and roller chain
			(Overflow to G6, solids to G7)				
			(From G6)				
		G6a1	Tank		60-ft. diam. by 12-ft. deep, ½-day capacity		
		G6a2	Pumps (2)	Ingersoll-Rand		7½-hp. U.S. (2)	
			(To M1 and L20)				
			(From G6)				
		G7	Pump, Return-underflow (to G5)	Ingersoll-Rand		1-hp. U.S.	
	Gypsum Filtering, Mixing, and Drying		(From G5)				
		G8	Pump	Oliver-Sabin	4-in., 75-gal. per min.	Vacuum pump	
		G9	Filter	Oliver	Salt-type, "stream-lined", 6-ft. by 6-ft.	3-hp. U.S.	U.S. Varidrive
			Agitator			2-hp. U.S.	
			Pump, Filtrate			1-hp. U.S.	
			(From G9 & G12a)				
		G10	Mixer	Link-Belt	Paddle, 12-in.	5-hp. U.S.	U.S. Varidrive
		G11	Kiln Mill and Drier	Raymond	Flash, No. 60, 90-ton per day capacity	25-hp. U.S.	
		G12	Cyclone	Raymond	6-ft. 6-in.		
			Fan	Clarage	Type O, No. 17.	25-hp. U.S.	Direct-connected
		G13	Gate		12-in., two-way		
			(To G14 or G12a)				
			(From G12)				
		G12a	Feeder, Rotary	Raymond	12-in. by 24-in.	1-hp. U.S.	
			(To G10)				
	Gypsum Conveying, Storage and Loading		(From G12)				
		G14	Conveyor	Link-Belt	Screw	3-hp. U.S.	Falk reducer
		G15	Conveyor	Link-Belt	Screw	3-hp. U.S.	Falk reducer
			(To G16 or G15a1)				
		G16	Storage Building		2,000-ton, concrete-walled		
			(To G17 or G16a1)				
			(From G16)				
		G17	Unloader	Fuller	Type C automatic remote-control, 18-ton per hr. at 100 ft.	30-hp. and disk on screw 2-hp. (3) on wheels	
	Gypsum Pulverizing Storing, Sacking, and Loading		(From G15)				
		G15a1	Pulverizer	Raymond	Screen, No. O		
		G15a2	Storage, Pulverized-Gypsum				
		G15a3	Scales, Sacking				
		G15a4	Storage, Sacked-Gypsum				
			(To cars)				
DUST RECOVERY	Lime Department		(From L9)				
		L9a1	Dust Chamber		Brick-lined		
			Draft Fan	Rees	Variable-speed	10-hp. U.S.	U.S. Varidrive
			Stack		Steel		
		L9a2	Conveyor	Link-Belt	Screw, 9-in. by 14-ft.	2-hp. U.S.	Falk reducer
		L9a3	Elevator				
			(Dust to I8)				
	Magnesia Department		(From M21)				
		M21a1	Dust Chamber		Brick-lined		
			Draft Fan				
			Stack		50 ft., steel		
		M21a2	Conveyor		Screw, 9-in. by 18-ft.	2-hp. U.S.	Falk reducer
		M21a3	Elevator	Link-Belt	Bucket, 50-ft.	1-hp. U.S.	Falk reducer
			(To M20)				

The lime-storage bins, the thicknerers which remove the calcium-chloride brine from the magnesium-hydrate sludge and wash the latter before adding the ingredients used to make various grades of magnesite.



The double- and single-paddle slakers at the right; at the left the lime pulverizer and pipes leading to cyclone above.

fore filtering and calcining many types of refractories with different melting points and other characteristics can be made. A degree of chemical and physical uniformity of product hitherto unattainable without great expense is claimed. Eventually it is expected that almost any desired refractory will be made to prescription.

The products listed above are made through the addition of silicon oxide, alumina, iron oxide, lime, etc. in powdered form.

The gypsum is an almost unavoidable by-product obtained at slight additional expense. It is almost entirely free from such impurities as silica and iron and aluminum oxides and has not a trace of fluorine or arsenic. Its rate of solubility in water is much greater than that of the natural product.

The chemical reactions on which the process is built are very simple. The gypsum is produced as follows:

Raw bittern + Calcium bittern = Magnesium bittern + Gypsum

$(MgSo)$ $(CaC1_2)$ $(MgC1_2)$ $(CaSO_4\text{-}2H_2O)$

Magnesia is produced from the magnesium bittern of the above reaction:

Magnesium bittern + Lime = Calcium bittern + Magnesium hydrate

$(MgC1_2)$ (CaO) $(CaC1_2)$ $(Mg(OH)_2)$

This reaction regenerates the necessary calcium bittern for the treatment of more raw bittern. The magnesia kiln calcines magnesium hydrate to magnesium oxide, and shrinks it by further heating to give it the desired properties:

$$Mg(OH)_2 + \text{heat} \rightarrow MgO + H_2O$$

The oyster shells are bought under contract and are dredged from the bay by a suction dredge. On this dredge the shells are washed in trommels until they contain less than .2 per cent. silica and are practically free from other contamination including magnesia. These washed shells have an almost constant chemical content which is important, as a uniformly-slaking lime is necessary in this process. The shells are transported on barges through a canal to the plant unloading dock. This canal, which was recently completed, is 60 ft. wide and 8,500 ft. long. An 8-ton Judson-Pacific Co. gantry crane with a 5-cu. yd. clamshell bucket unloads the shells from barges either direct to cars for delivery to the plant or to stock-piles. The crane also transfers the shells from the stock-piles to the cars. The crane operates on rails 90 ft. apart and serves a storage space which is 300 ft. long and has a capacity of 10,000 tons.

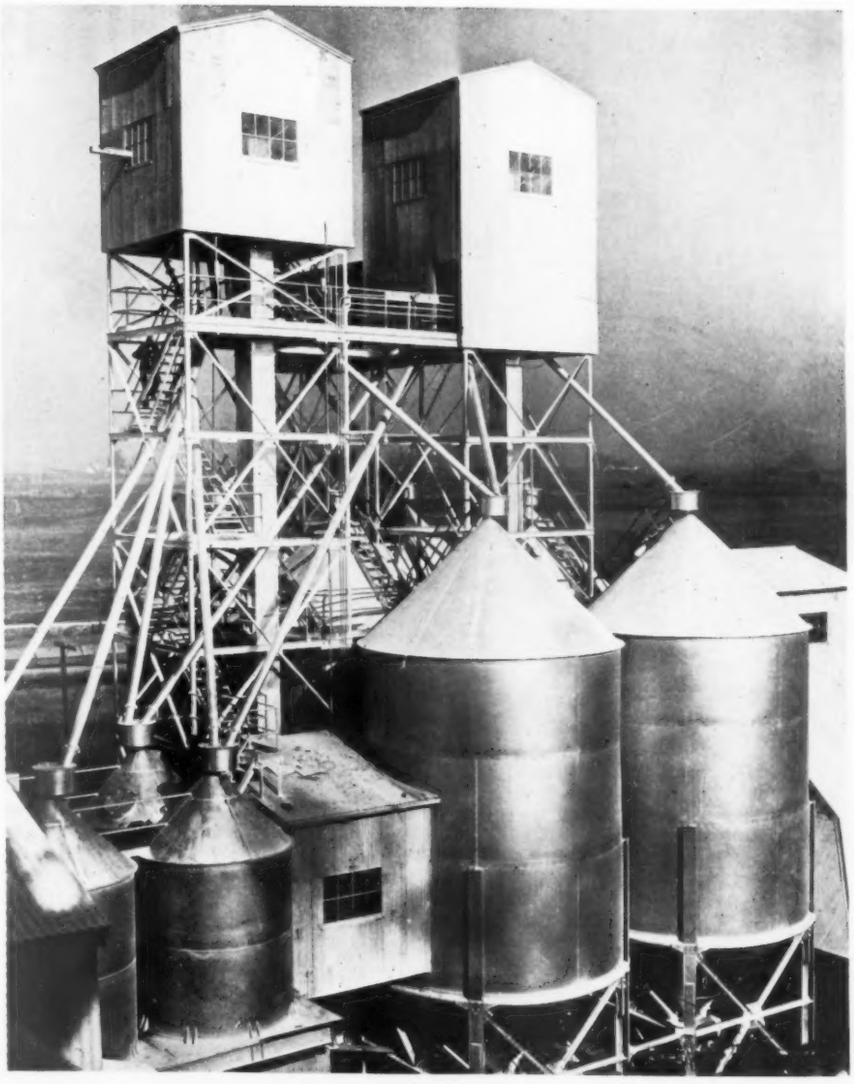
The three cars used for shell haulage are of the bottom-discharge type

with special high wooden hoppers each holding 200 cu. yd. of shells weighing 900 lb. per. cu. yd. A Novo 2-drum car-puller hauls the cars on a standard track an average distance of 250 ft. to a track hopper. A sidetrack is provided near the hopper so that one car, either full or empty, can be kept in reserve while one car is being loaded and another unloaded. Each car holds enough shells for operation during one 8-hr. shift.

The track hopper has a capacity of 100 cu. yd. A reciprocating feeder discharges the shells on a 140-ft. inclined belt-conveyor equipped with a Dings magnetic head pulley to remove tramp iron. The shells are discharged into the hopper of a Link-Belt screw-feeder of original design which carries the shells into the lime kiln. A water jacket protects the screw from the heat in the kiln. The cooling temperature can be regulated so that the feed screw will not be affected by the heat and yet will be warm enough to prevent condensation so that it will not be damaged by the acids and salts in the kiln gases.

The Traylor rotary lime kiln is 7½ ft. in diameter and 315 ft. long and is of all-welded construction. The six tires are supported on single sleeve-bearing rollers. Beginning at the feed end, the first 10-ft. section of this kiln is unlined and equipped with lifter plates. The next section, 255 ft. long, is insulated between the steel shell and the refractory lining with Johns-Manville 2½-in. thick Superex blocks, the refractory lining consisting of 115 ft. of Stockton Firebrick Co.'s 6-in. rotary kiln blocks, followed by 100 ft. of General Refractories' 42 per cent. alumina blocks 6 in. thick and then 40 ft. of 6-in. Arco 70. The next 42-ft. section of the kiln is uninsulated and lined with General Refractories chrome-free Ritex 9-in. bricks. The last 8 ft. is lined with 9-in. Arco 70. Johns-Manville No. 319 semi-refractory cement was used between the kiln shell and the insulation and between the insulation and the lining. The lining is keyed to the shell circumferentially at each 20-ft. interval by a complete circle of three courses of 9-in. refractory blocks extending to the shell and longitudinally by four single courses of 9-in. blocks dividing it into quadrants, The longitudinal courses are staggered in succeeding 20-ft. sections.

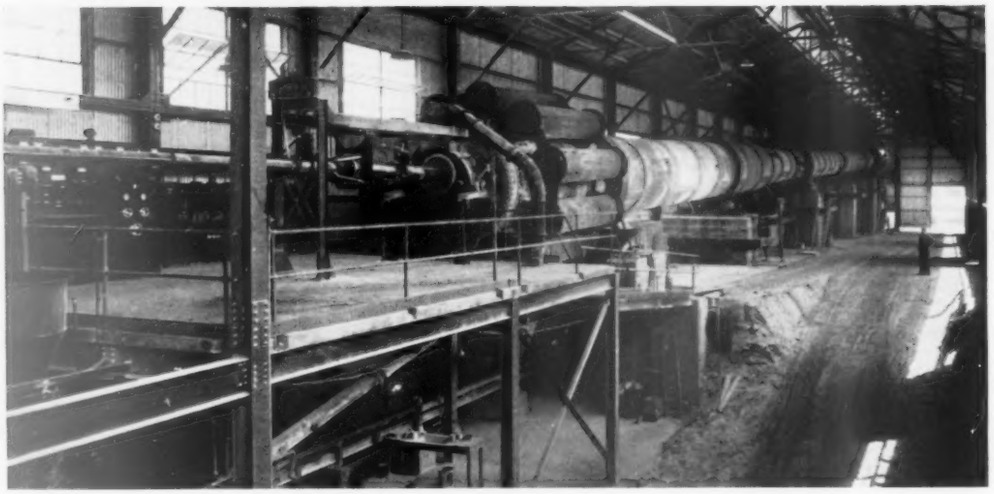
The kiln is fired with Dubbs 8 Baumé residual oil rated at 154,000 B.t.u. per gal. About 55 gal. of oil is required to burn a ton of lime. The fuel oil is preheated by steam at the



The six 500-ton magnesia-storage bins. Two of the 60-ton bins at the left store crushed feed.

The automatic-throwout pulverizer, the packer and the hydrator in the commercial-lime plant.

UNAX ROTARY KILNS FOR LIME BURNING



The advantages of the Unax Rotary Kiln are:

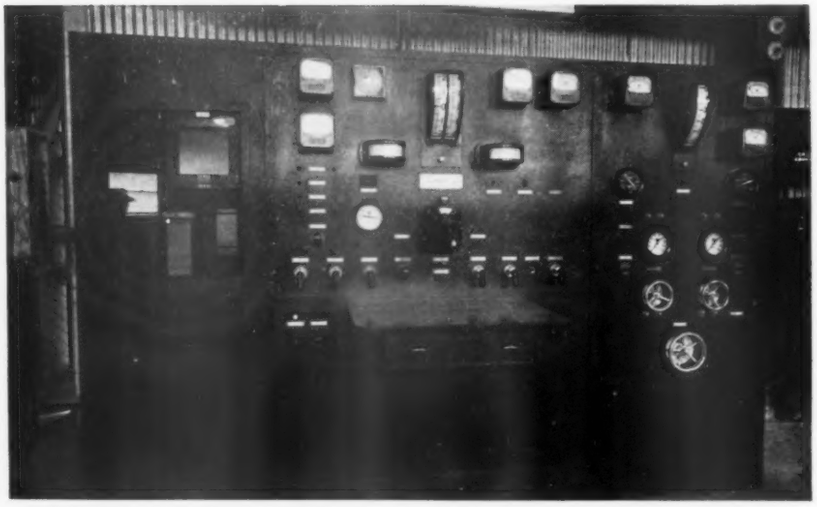
Low fuel consumption.

Reduced cost of production.

Better quality and greater uniformity of product.

● **The Kiln illustrated is installed in the lime plant of H. E. Millard, Annville, Penna.**

THE modern, efficient **Unax Rotary Kiln** for calcining lime is the result of our many years experience in manufacturing and engineering hundreds of rotary kilns in such industries as cement, ore, lime, chemical, etc.



The **Unax Cooler** is integral with the kiln and provides efficient cooling of the calcined material by means of the air for combustion which thereby becomes pre-heated to a high degree.

The **FLS Centralized Kiln Control** concentrates at one convenient point the control switches of the kiln and auxiliary equipment, sequence interlocks, alarms, signals, and instruments showing speeds, draft temperatures, etc., constantly presenting to the kiln operator a clear, quick picture of the kiln's operation.

The **FLS Gas Analyzer permits** obtaining complete combustion of the fuel while avoiding excess air in the kiln.

F. L. Smidth & Co. are manufacturers of Rotary Kilns, Coolers, Grinding Machinery and auxiliary apparatus, and in addition are Engineer Specialists in designing and equipping plants employing such machinery.

F. L. SMIDTH & CO.

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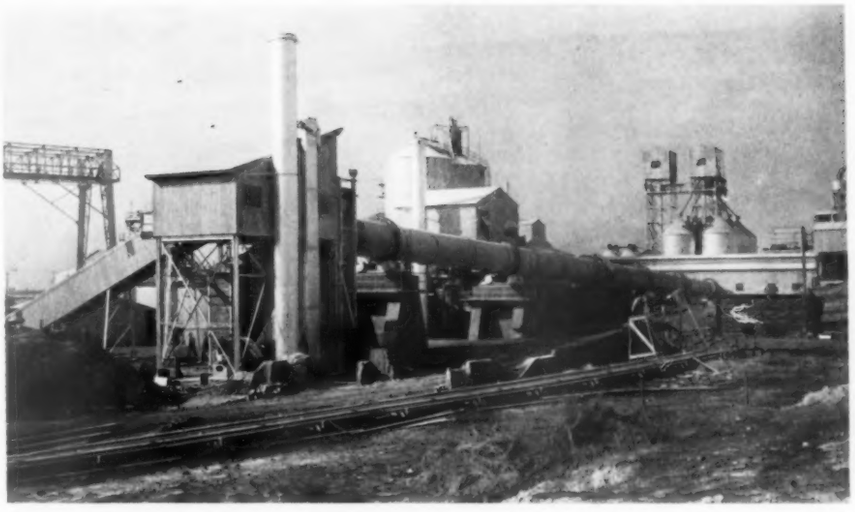
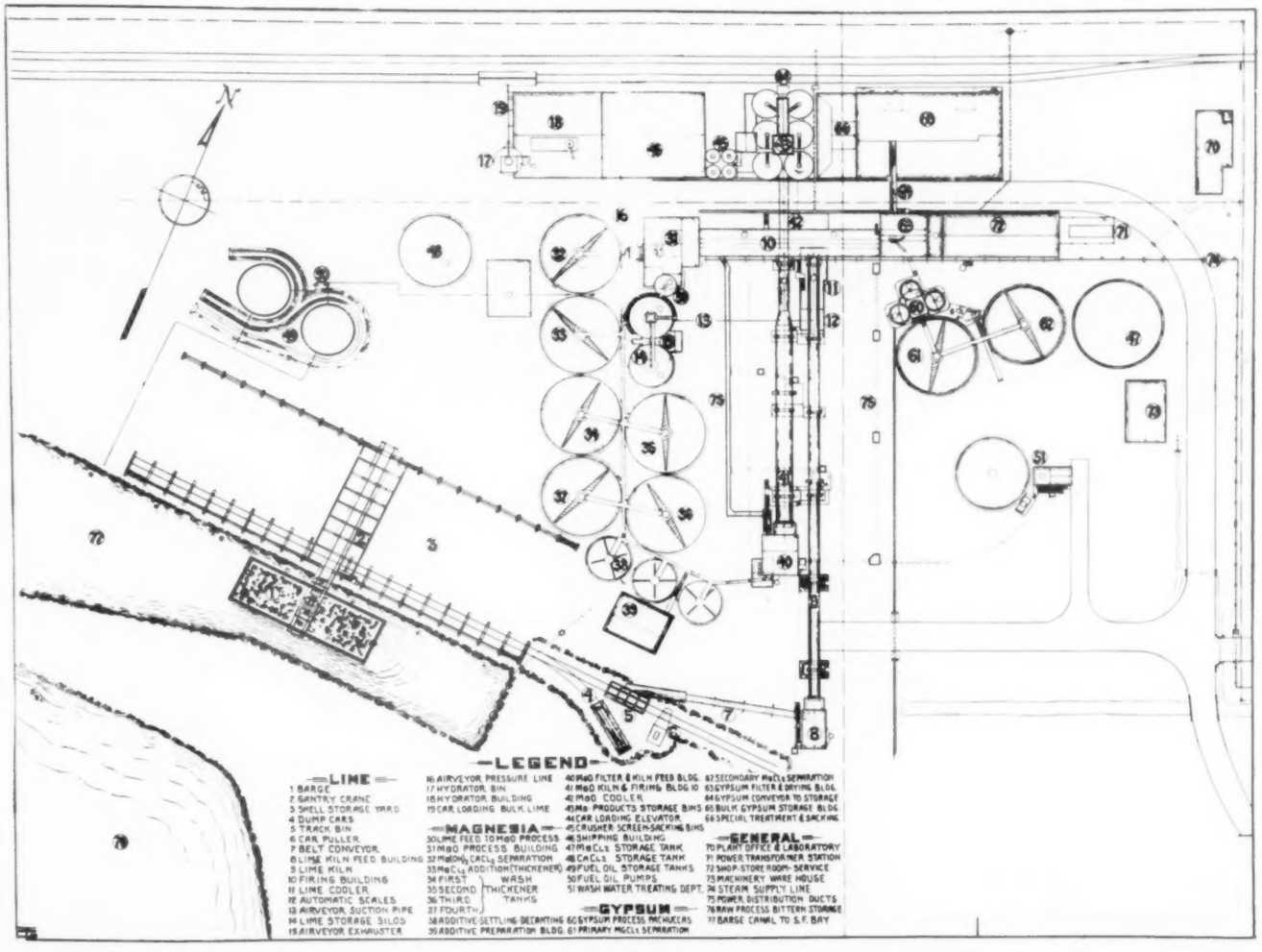
storage tanks in a Ross tube-type heat exchanger to a suitable consistency and is then pumped to another Ross heat exchanger at the kiln heads, where it is further heated to 180 deg. F. The kiln is fired by a Pan-American Eng. Co. Simplex low-pressure, air-atomizing burner. A similar burner is used on the magnesia kiln. A stand-by relief valve returns the excess oil to the suction side of the Worthington gear pumps in this system, making possible a controlled constant pressure at the burner. The Simplex blower is located above each burner and the manifolds are arrange so that either blower can serve either kiln.

A variable-speed fan draws the hot kiln gases through a brick-lined dust chamber into the base of a steel stack. The ducts were coated with Johns-Manville insulating cement and weatherproofed with Johns-Manville Insulkote before they were covered with aluminum paint. The stack is lined with cupola blocks. A screw-conveyor and an elevator return the kiln dust from the dust chamber to the kiln feeder. Thermocouples in the center of the kiln in the dust chamber register on the kiln-control board. Temperatures at these points are about 700 deg. C. and 300 deg. C. respectively. A Leeds & Northrup recording radiation pyrometer is used at the kiln hood to insure accurate control of the hot-zone temperatures. Later this pyrometer may be connected so as to control automatically the flow of fuel oil to the burner. A fuel consumption



The rotary lime kiln with gantry crane and shell conveyor at left. Elevator in foreground returns stack dust to kiln.



Lay-out of the plant and grounds.

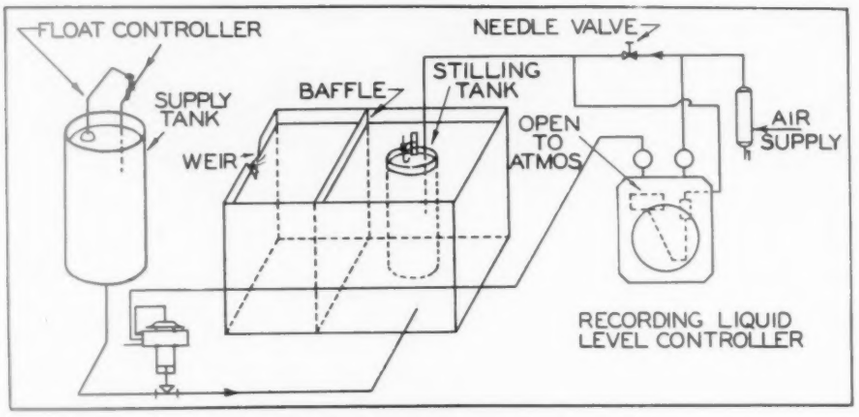


Diagram showing liquid-level control of weir tank.

of 4,500,000 B.t.u. per ton of lime is ultimately expected. Dust is taken from the chamber by a screw-conveyor to a bin from which it can be removed as desired.

The lime is discharged from the kiln into a Traylor 5-ft. by 50-ft. return rotary cooler which is in a concrete pit under the kiln and supplies preheated secondary air to the kiln. This cooler is lined for 20 ft. with Stockton 4½-in. standard alumina bricks, and the last 30 ft. is unlined. It is equipped with diaphram-type lifters or heat exchangers. At the discharge end of the cooler is a troughed steel ring with ¾-in. round holes. A heavy steel ball rolling around this ring acts as a ball-mill and breaks the lumps in the material. The lime leaves this cooler at a temperature of about 150 deg. F.

A Parsons weighing feeder records the production of lime, and at this point a bucket sampler takes cross-section samples amounting to about 1 per cent. of the material. A screw-feeder then discharges the pebble lime into the 6-in. intake line of the Fuller Airveyor pneumatic transport system which is a very versatile device. This combination vacuum-pressure system is designed to feed the lime into any of five silos: two 1,400-ton quicklime storage silos, a 100-ton silo feeding the magnesia system, a 100-ton silo for the hydration or shipment of quicklime, and a silo for rejected material. When starting the kiln after a long shut-down, any rejected material can be diverted into the reject silo for disposal. The Airveyor can also be used to transfer the lime from either of the two large silos into any of the others when the kiln is not running.

A Fuller two-stage combination cyclone or receiver on the top of one of the main storage silos settles out the dust, and the air is returned to the suction side of the Airveyor blower. The air is finally discharged to the atmosphere through a multi-tube type filter over the quicklime silo. This system makes possible the conveying, storage and handling of lime without raising dust. In transferring the lime from the main silos to the quicklime-sacking and hydrator-feed silo it is discharged through rotary air-locking gates into the Airveyor pressure line which passes under these silos. Lime is transferred from this silo and the main silos into the magnesia silo by discharging through the bottom outlets into the

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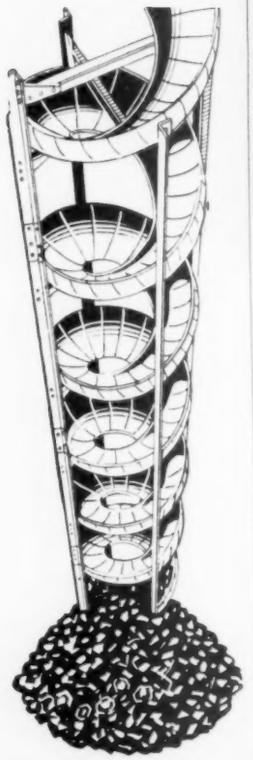

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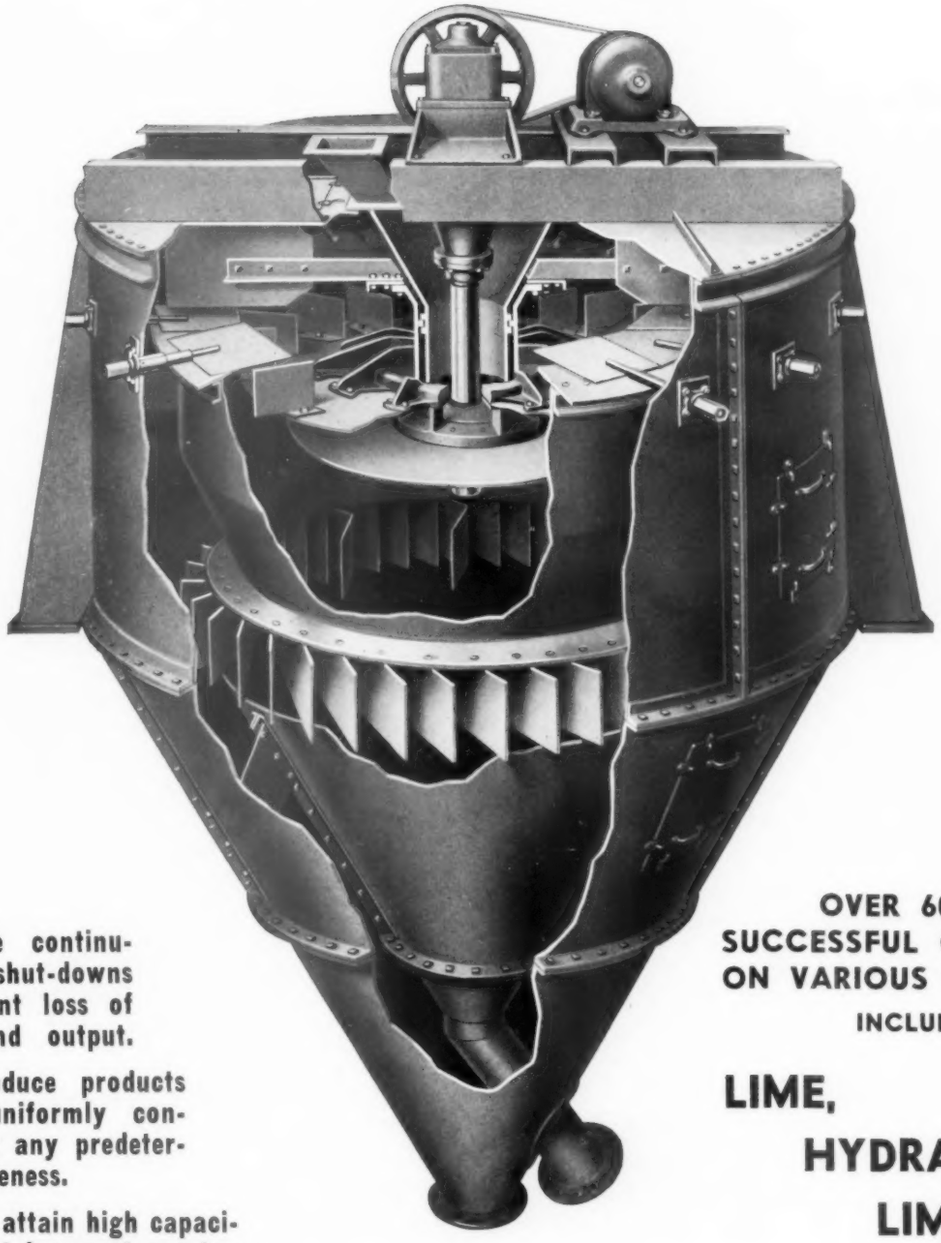

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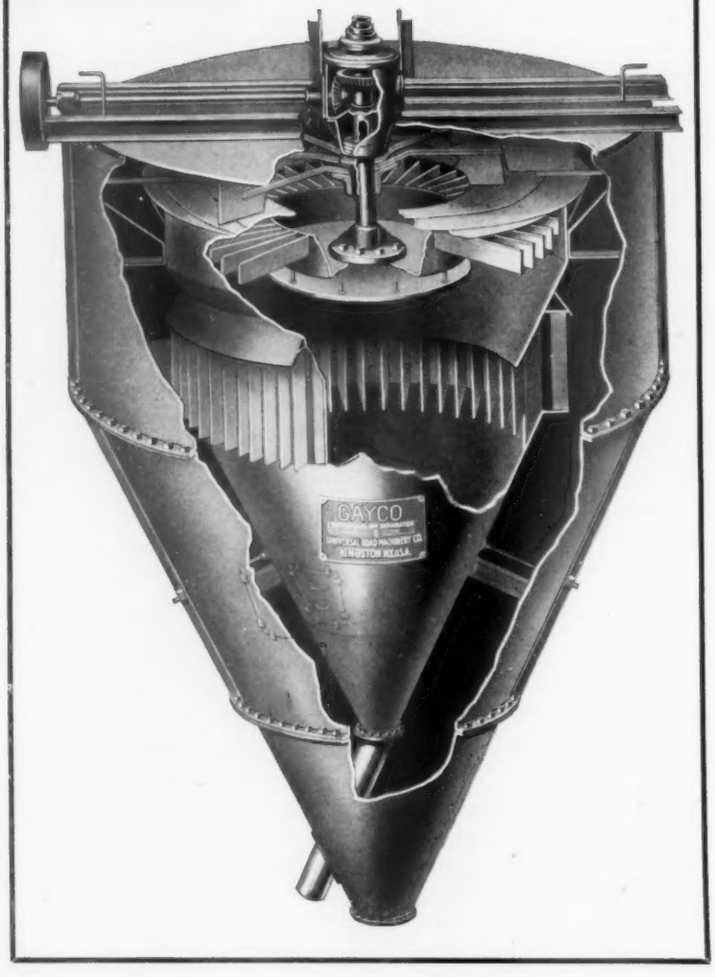

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suction line of the Airveyor. The Airveyor system has a capacity of 5 tons per hr. from the cooler to the storage bins and also 5 tons per hr. from the bins to process and these two operations are carried on simultaneously. Adjacent to the Airveyor blower is a lighted panel board showing which gates are open and where material is being delivered.

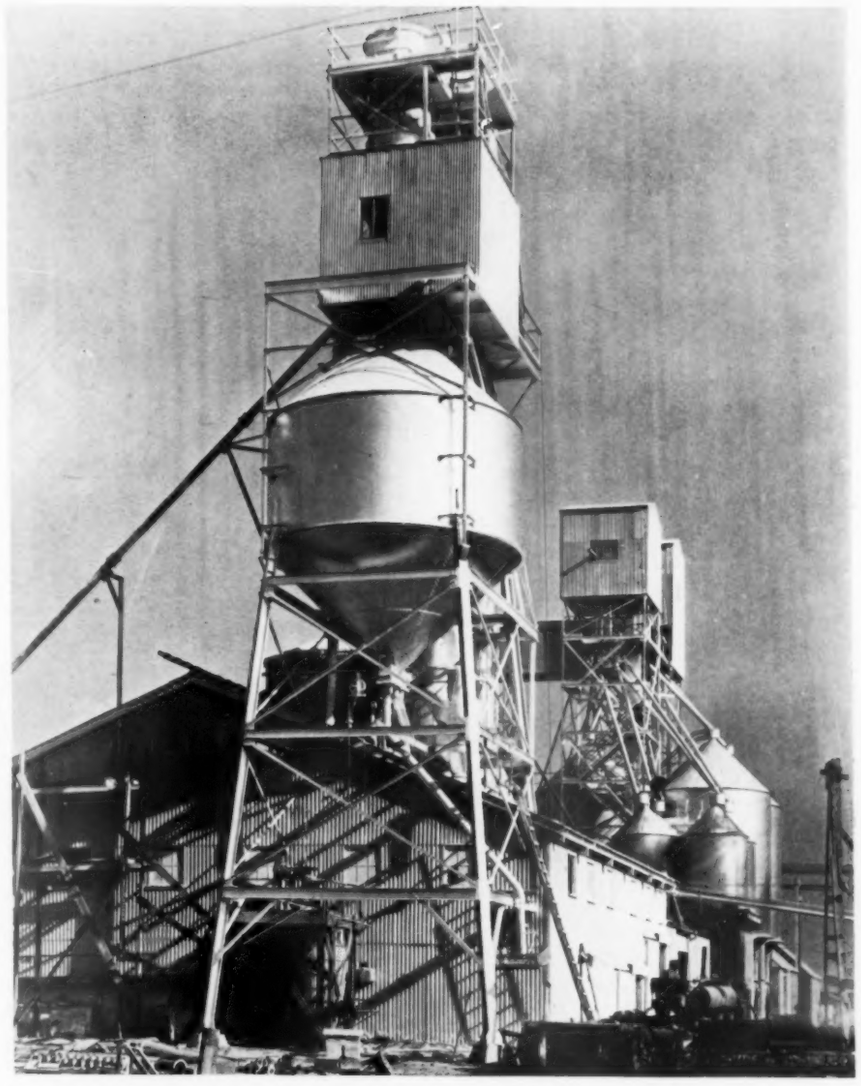
The commercial lime-hydrating plant is about the same as it was when described in the November 19, 1931 issue of *Pit and Quarry*. A 100-ton silo filled by the Fuller Airveyor system is used to supply quicklime for sacked quicklime shipments and for hydration. For the latter step a Link-belt screw-feeder, powered by a U. S. Varidrive, supplies a 2½-ton-per-hr. continuous Schulthess hydrator. This in turn feeds a No. 1 Raymond automatic-throwout pulverizer fitted with an air-separator. Since the product is of such a nature that little or no aging is required, the Raymond cyclone delivers it directly to the sacking bin. Sacking is performed by a Ba es 2-spout packer. Considerable care has been taken to eliminate dust in the sacking operation.

Bulk quicklime shipments are obtained directly from the Airveyor pipe. By opening the proper gate the lime is spouted direct to either end of a box-car as desired. Lime can also be discharged from the Airveyor system into a reject bin.

The shipping and hydrating room is kept clean by means of a vacuum-cleaner system made by the Spencer Turbine Co. A long, flexible pick-up hose allows the operator to collect dust or spillage from any point and throws the material to a small bag house. The material passes through a separator which removes trash and the remainder is reclaimed by a small cyclone. The intake end of the Airveyor suction line is equipped with a connection so that a small light hose may be attached for cleaning up dust deposits in the kiln room.

The quicklime is discharged from the magnesia-system tank through a Parsons weighing and recording feeder into a Raymond No. 1 automatic-throwout pulverizer, which is equipped with a 5-ft. Whizzer separator. A Raymond No. 8L fan blows the pulverized lime to a 6-ft. Raymond cyclone which feeds a slaker. This system operates in closed circuit, the air from the cyclone returning to the mill.

The slaker is a horizontal double-paddle machine followed by a single-paddle slaker in which the sulphate-free magnesium-chloride brine from the gypsum plant is added. The resulting mixture of magnesium hydrate and calcium-chloride brine is discharged from this slaker into a Traylor 10-ft. by 36-ft. rolling barrel, which is equipped with lifters. This barrel retains the solid materials for several hours and insures complete reaction without any further change in their physical properties.

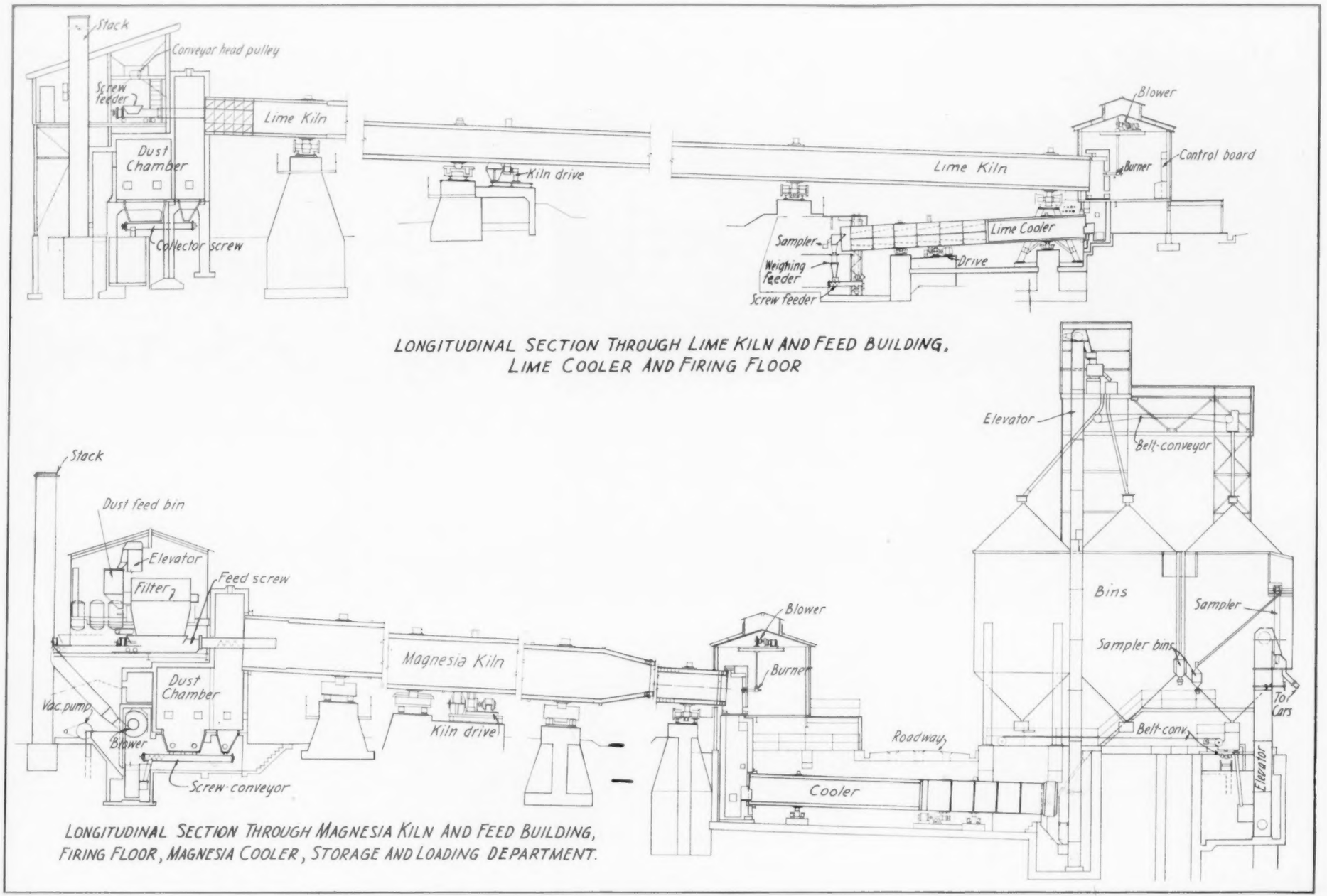


The commercial-lime hydrating, grinding, packing and shipping department retained from the original plant. From the filter at the end of the pneumatic-conveying system above the spout loads material into cars.

The magnesium-hydrate sludge and calcium-chloride brine resulting from the reaction are discharged from the barrel into a Dorr 55-ft.-diameter by 12-ft. mechanical thickener, which is used as a separator. In this thickener the sludge, being insoluble, drops to the bottom. The calcium-chloride overflows into a storage tank from which it is drawn to precipitate the gypsum from the raw brine in another part of the plant to be described later.

The magnesium-hydrate sludge is transferred from the separator by an Oliver-Sabin pump into the first of a series of five 55-ft. by 12-ft. deep Dorr thickeners which have mechanical rakes and are used to wash the magnesium hydrate free of salt, calcium chloride, etc. Each thickener has an Oliver-Sabin pump to move the sludge to the following tank and submerged Sterling centrifugal pumps move the overflow wash-water counter-current to the sludge flow. The water from the first two thickeners overflows into a ditch and goes to waste.

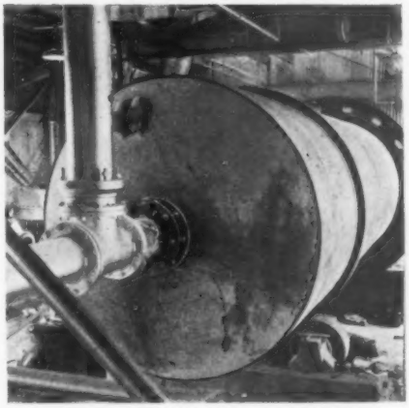
The washed magnesium hydrate is transferred by an Oliver-Sabin pump into any one of three 30-ft.-diameter additive tanks equipped with Dorr revolving mechanical agitators. While one of these tanks is being filled, another is being emptied, and the third is being used for the return of the mixture. After a tank is filled it is



Longitudinal sections of the lime and magnesia burning buildings.

decanted for 24 hr. and the sludge is discharged into a double-paddle mixer similar in design to the slaker already described. In this mixer silicon oxide, alumina, iron oxide, lime or other ingredients are added in powdered form for making various products. The mixture is then returned by an Oliver-Sabin pump into whichever one of the additive tanks is empty. Another Oliver-Sabin pump feeds the mixed slurry to an 8-ft. by 12-ft. Oliver drum-type cloth filter. The filter cake drops from this filter into a Link-Belt jacketed screw which feeds it into the magnesia kiln.

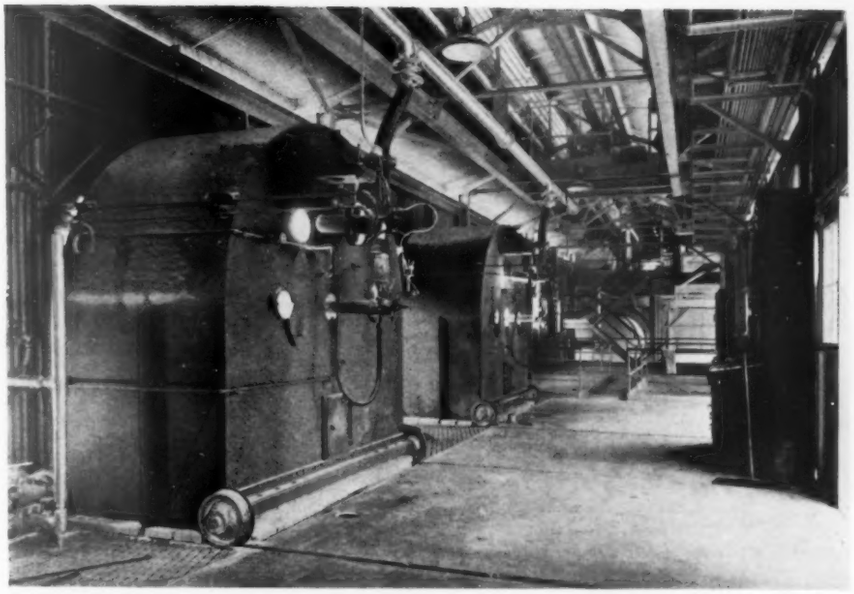
The Traylor wet-process rotary magnesia kiln is 190 ft. long and is all-welded. It is 11 ft. in diameter for 140 ft. of its length at the feed end and is tapered in a 10-ft. section to a diameter of 7 ft. for the last 40 ft. of its length at the discharge end. The enlarged section is necessary because the bulk of the calcined magnesia is about one-fourth that of the filter cake fed into the kiln. The temperature in this kiln varies between 1,000 and 1,800 deg. C. depending on the product being made. Draft is supplied by a fan through a brick-lined dust chamber and a 50-ft. steel stack. A



The 10-ft. by 36-ft. rolling barrel wherein the reaction between the magnesium hydrate and the calcium chloride brine is completed.

screw-conveyor feeds the dust from the chamber to a bucket-elevator. This dust is mixed with the filter cake fed to the kiln.

The hot zone of the kiln is lined with General Refractories Ritex liner blocks, the taper with Arco 70, the next 40 ft. with 6-in. Semal kiln blocks and the next 50 ft. with Standard alumina bricks of the same make. The remainder of the kiln is lined with Stockton Fire Brick Co's standard rotary-kiln blocks. This kiln is insulated from the low-temperature end of the hot zone to within 21 ft. of the feed end with Johns-Manville 2½-in. thick Superex blocks. The 50-ft. hot zone



The kiln-firing floor, showing fuel pipes and burners, radiation pyrometers, and, at right, the control boards.

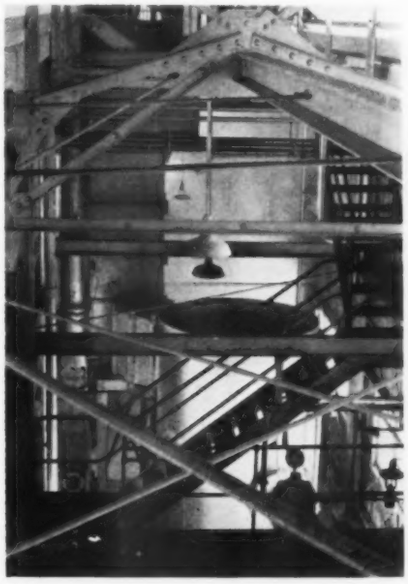
is not insulated. The kiln is fired with a burner of the type used on the lime kiln already described.

The calcined megnesia is discharged from the kiln into a 6-ft. by 60-ft. Traylor rotary cooler. This is lined for the first 35 ft. of its length with 6-in. General Refractories standard alumina bricks. The remainder of its length is of patented diaphragm construction. The discharge end of the cooler is also equipped with a ball and a troughed section with ¾-in. round perforations. This cooler is in a pit extending from the kiln building under a roadway to the storage and loading department and acts as a conveyor as well as a cooling mechanism.

The cooled and crushed magnesia is discharged from the cooler into a 110-ft. bucket-elevator from which it can be discharged by gravity into any one of the six 500-ton cone-bottom steel silos or into a 100-ton "reject" bin. Two of the large silos are beyond gravity range and a short belt-conveyor is used to feed material into them. Under each row of three silos is a collecting belt-conveyor. Material from either conveyor can be discharged into a bucket-elevator for bulk loading into cars.

These conveyors can also discharge on a series of two belt-conveyors feeding a bucket-elevator. This elevator can discharge either back into two of the 500-ton silos or into a 60-ton crusher-feed bin. A pan-feeder controls the discharge of uncrushed material to the 14-in. face by 30-in. diameter Traylor double-roll crusher, the product of which is taken by a bucket-elevator to a 3-ft. by 5-ft. Link-Belt single-deck vibrating screen. Material retained on this screen is returned to the crusher-feed bin. The fine material passing through the screen is discharged into the main elevator previously mentioned. From this elevator these fines can be spouted, as previously described, into two of the six 500-ton silos, or into two of four 100-ton silos. The material in the large bins can be removed by the conveyor and elevator system already mentioned for bulk loading into cars or into the other two 100-ton silos for sacking. Sacks are loaded through spouts under these silos.

The calcium chloride is pumped from the storage tank previously mentioned into a weir tank. A Taylor Fulscope maintains an even tank level,

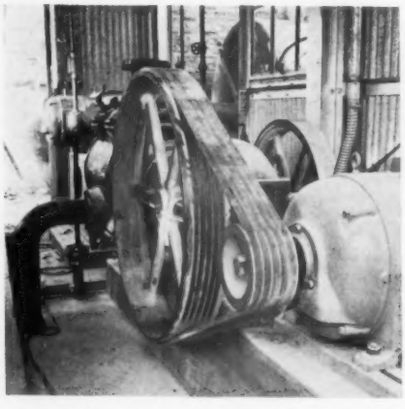


View in the gypsum-process building, showing part of the flash-drying system.

The gantry crane which transfers shells from barges to storage pile at left or to cars for delivery to lime kiln in background.

thereby creating an absolutely constant flow over the weir. The raw bittern pumped from a pond contains magnesium chloride and magnesium sulphate and its feed is controlled by a similar system. These fluids are fed into one of three Pachuca tanks or conical-bottom agitating tanks with center air tubes, a type of equipment commonly used in metallic mining. One of these tanks is always being cleaned out while the other two are in use. The mixture is then passed into a second Pachuca tank from which it overflows into a 55-ft.-diameter by 12-ft. Dorr thickener. The reaction precipitates the sulphates in the form or gypsum from the magnesium-chloride liquid. This liquid still contains a small amount of solid calcium sulphate and is passed into a second thickener of the same description, wherein final sedimentation of the gypsum takes place. The magnesium chloride overflowing from the second thickener goes into a 69-ft. by 12-ft. storage tank from which it is pumped to the lime slakers previously described.

The fine crystals precipitated in the second thickener are pumped back into the first thickener, where they eventually grow large enough to be carried along with the main flow of gypsum crystals. An Oliver-Sabin pump feeds the gypsum to a 6-ft. by 6-ft. Oliver salt-type filter which is of special "streamlined" design for free air flow and is made of cast iron to resist corrosion. Complete washing of the gypsum is obtained by sprays on the filter. The gypsum filter cake drops into a paddle mixer which feeds a Raymond cage-type kiln mill and flash-drying system. This consists of a No. 60 flash drier equipped with a cyclone and a fan designed to dry at least 75 tons of gypsum daily without calcination. The furnace used can burn either gas or oil and is lined with Johns-Manville C-22 circle-shaped bricks and a 3-in. thickness of Sil-O-Cel powder between the bricks and the oven shell. Proper control of the drying temperature is maintained by a Foxboro temperature controller. A certain percentage of the dried gypsum is returned into the feed screw to facilitate drying. The dried product is drawn into the cyclone, whence a screw-conveyor



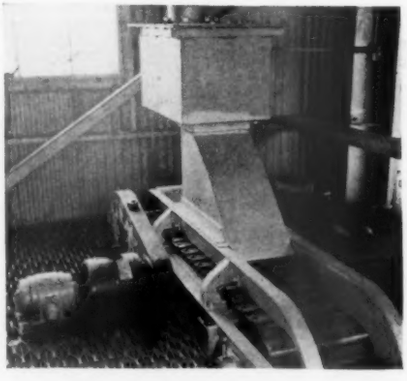
One of the compressors which supply the air used in plant operations.

carries the gypsum across a road to another distributing screw-conveyor in the roof of a concrete-walled storage building having a capacity of 2,000 tons. A Fuller-Kinyon Type C automatic remote-control portable unloader loads the gypsum into cars.

Special grades of gypsum are prepared from the standard grade in an adjoining building. Where grinding is necessary, a Raymond No. 0 screen pulverizer reduces the particle size to 95 per cent. minus 325-mesh at a rate of 3,00 lb. per hr. From the pulverizer the gypsum goes to storage, thence to the sacking scales, and then to storage for shipping.

All the fresh water used in this plant is obtained from two 700-ft. wells with Sterling deep-well pumps and is stored in a 2,000,000-gal. pond. Although this water is very soft, a complete water-treatment plant has been built to remove the bicarbonate radical. This treatment is so successful that no filters are needed for clarification. Settling alone is necessary to provide an overflow of clear water at the rate of about 700,000 gal. daily. Hydrated lime and ferric-chloride are added to promote flocculation in a Dorr flocculator. A No. 2 Savage-Gauntt feeder is used for the hydrated lime, and a specially designed siphon-type feed for the ferric-chloride solution. The water flow is controlled and metered by another Taylor Fulscope controller. Automatically-controlled pumps transfer the clear water to various parts of the plant, as well as the raw water from the storage pond to the water-treatment plant.

The plant buildings are made of structural steel with concrete floors



The pan-feeder which supplies magnesia to the double-roll crusher.

and foundations and Armco corrugated-metal roofing and siding. All metal parts, except the kiln shells and the Armco corrugated metal, are painted with a special grade of du Pont Dulux aluminum lacquer which has been found to be particularly resistant to the action of alkaline dusts and salty atmosphere. The only wood used in the plant is in the dissolving tanks for the ferric-chloride solution used for water treatment.

The various steel tanks—agitating, thickening, clarifying, mixing, storage, etc.—used in this plant are of the floating type, following the practice in the oil fields. These tanks "float" on an oil-impregnated base retained by a reinforced-concrete curb around the tank at ground level. This type of

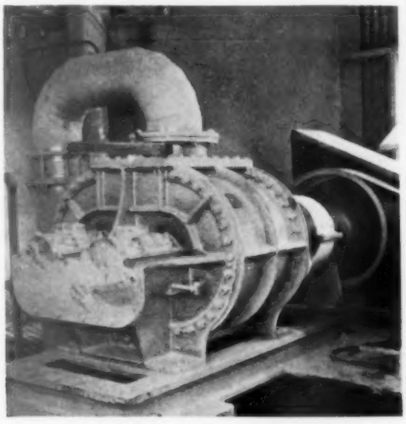
base insures evenly-distributed pressure at all times on the bottom of the tank, allows for variations in load, and keeps the bottom of the tank from rusting. This type of construction can, of course, only be used when a tank has no bottom outlets.

A thickener system involving counter-current washing is usually constructed with staggered levels so that the flow of the wash-water from the last wash is by gravity from tank to tank, ending with the first wash tank at ground level. Sludge-transfer connections are made under the tanks at their centers, and means must be provided for access to the valves and fittings under the tanks. If this construction had been followed in this plant, the last wash tank would have been 8 ft. from the ground, the next 6 ft., etc. For tanks of this size, on level ground, the foundation costs would have been excessive. Instead, all the tanks were placed at the same level, on cheap oil-impregnate sand as stated above. No bottom connections were made. The sludge pumps were mounted just above the centers of the tanks with their suction lines extending into the central wells. By this means these lines were shortened by about 36 ft. per tank with consequent power and trouble saving, and the sludge transfer launders were increased about 30 ft. each, which approximately doubles the effectiveness of each wash step. The penalty incurred was the installation of a low-lift (2-ft.) water-transfer pump for each wash-water transfer. The savings effected in foundation costs alone make this type of construction very much worth while.

The vibrating screen which returns oversize magnesia to the double-roll crusher.

The Taylor Fulscope flow-controller recorders used in this plant are new and were designed by the Taylor Instrument Companies. On the suggestion of M. G. Mastin of Westvaco a method was worked out for regulating the flow of liquids by insuring a constant liquid level in the weir tanks. Orifice measurement was out of the question because of the corrosive nature of the liquids.

The level of the liquids in the weir tanks is maintained at a constant point by means of a manometer-type controller and a diaphragm valve with a Valv-Precisor, as shown in the accompanying diagram. The material is fed into the box through a pipe leading from a supply tank in which a float controller keeps a constant quantity of liquid available at all times. The fluid may also be pumped, if the pressure is constant, thereby eliminating the supply tank. A bubble pipe is placed in the stilling tank, the end being below the surface. Air is fed into this pipe at a constant rate from a constant-pressure air supply through a needle valve. The back pressure in the bubble pipe varies with the level of the liquid. As the level increases, more resistance is offered to the escape of air, and the back pressure builds up. On the other hand, as the liquid decreases there is less resistance offered for the escape of air, and the back pressure drops. A measurement of this back pressure is a measurement of the liquid level in the weir tank, this being accomplished by the manometer-type recording liquid-level controller. The bubble pipe is connected to the high-pressure leg of the manometer, while the low-pressure leg is open to the atmosphere. As the back pressure varies, due to the changes in the level of the liquid, the differential between it and atmospheric pressure also varies, and is measured by the recorder. Changes in atmospheric pressure do not affect the instrument.



The exhauster of the pneumatic-conveying system used to move the pebble lime from the cooler to storage and to the various plant departments.

To effect level control a diaphragm Motosteel valve with a Valv-Precisor is used in the supply line. As the liquid level approaches the control point, the valve closes to reduce the flow. The sensitivity setting of the controller depends on the particular installation. A high sensitivity can not be used, as the valve will operate too fast for the controller, and a continual level fluctuation results.

The Oliver-Sabin pump is a new type of pump for handling slurries, slips, sand, etc., and is similar to the automatic *montejus*, or air-lift pumps, used in the mining industries. This pump works on the pulsating principle, subjecting the material within the pump chamber to alternating high and low pressures by means of float-operated control valves. Either a vacuum or compressed air, or both, can be used as the activating force. The material enters or leaves the pump through Flex-seal check valves of soft rubber

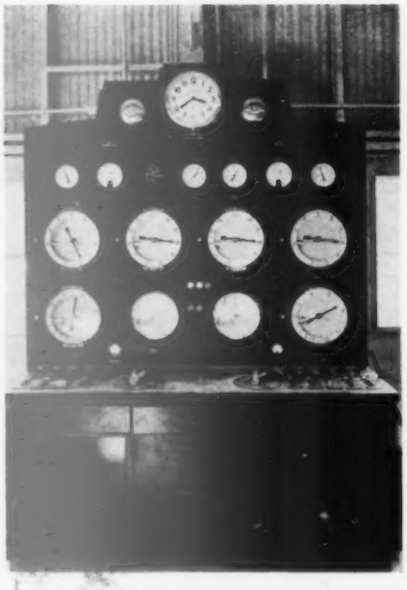
The bromine and magnesium-chloride plant, which was built in 1929 and is near the new plant.

with an internal grid protecting them against collapse from external pressure. These valves form tubes when open. In pumps of this type there are no moving parts which come in contact with the materials being handled or which need to be lubricated. No glands or stuffing boxes are used and the simple control valves require only occasional attention. They start instantly without priming, and may be started, stopped or regulated manually simply by turning a valve. They also stop automatically when the feed sent to them stops and start when the feeding is resumed. They will hold a constant rate of flow or will automatically maintain a constant level in the filters, tanks, etc., into which they discharge. Each Oliver-Sabin pump used in this plant is provided with a counter which serves as an accurate meter, as the pumps deliver a constant volume per stroke. The use of these pumps made it possible to place all the thickener tanks and some of the others at ground level instead of building expensive foundations to make gravity flow possible, as previously stated.

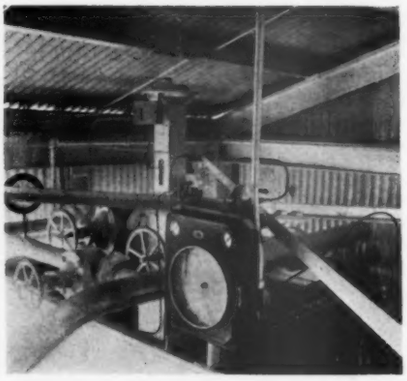
W. N. Williams, who represented the Westvaco Chlorine Products Co. on the Pacific Coast for years, is now general manager of its Pacific Coast division and in this capacity is in charge of activities at Newark. Paul A. Gross is production manager of this division and in this capacity is directly in charge of plant operations. M. G. Mastin is chief chemist, and D. M. Kerr is plant superintendent. Oscar Larson is maintenance superintendent.

Credit for the preliminary design of this plant belongs to the engineering and operating staff of the company and to the various manufacturers supplying the major equipment units. G. E. Sloat, who was with the California Chemical Co. for four years and then became general superintendent for the H. K. Ferguson Co. on this project, is responsible for the general design, the electrical-control system and the selection of most of the equipment. M. G. Mastin, who was in charge of the pilot plant, is also responsible for the instrumentation in this plant, and for much of the apparatus design. M. Y. Seaton, former technical director of the California Chemical Co. and now in charge of research for Westvaco, directed all the research and pilot-plant work.

The H. K. Ferguson Co. was employed by the Westvaco Chlorine Products Corp. to construct the plant, using as a guide preliminary lay-out and equipment specifications previously prepared by the client. The Ferguson Company maintained a large field construction force, prepared all drawings, purchased all equipment and construction materials. The Ferguson organization started work in February 1937, with engineering and field construction work running parallel, the job being completed in December of the same year.



Control board and instrument panel and the related equipment for one of the kilns. All recording and controlling instruments are centralized here.



One of the liquid-level control systems on the weir tanks.

Due to the somewhat unique processes involved, certain of the equipment was designed and fabricated to meet specific requirements. Buildings and all supporting structures were of steel, and designed to resist earthquake stresses. Tanks, bins, and rotary kilns were all of welded-steel construction.

The following companies supplied most of the important equipment in this plant:

Allis-Chalmers Mfg. Co.—Texrope drives.

American Rolling Mill Co.—All corrugated-metal roofing and siding.

Crane Co.—Some of the pipe and some of the valves.

Dings Magnetic Separator Co.—The magnetic pulley on the shell belt-conveyor.

Dorr Co.—Eight 55-ft. thickener mechanisms, three slurry agitators, and the water flocculator.

Falk Corp.—Some of the larger speed-reducers, including those driving the kilns and coolers.

Foxboro Co.—Two oil-flow meters, two temperature controllers.

Fuller Co.—The Airveyor lime-conveying system and the portable unloader used for loading bulk gypsum.

Gates Rubber Co.—Most of the V-belt drives.

The retractable water-jacketed screw-feeder serving the lime kiln. Shell conveyor and hopper are above.

General Electric Co.—Most of the wire, the switches, and the control boards.

General Refractories Co.—The 70-per cent. alumina refractory blocks and magnesite bricks lining the lime kiln, the Ritex magnesia liner blocks in the magnesia kiln, and some of the standard alumina bricks in the lime and magnesia kilns.

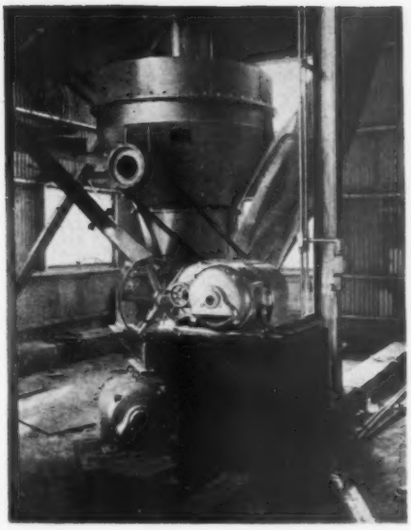
Goodyear Tire & Rubber Co.—All the conveyor belts.

Ingersoll-Rand Co.—Three class ES, 18-in. by 7-in. vacuum pumps and two class ES, 14-in. by 11-in. air-compressors, and most of the solution pumps.

Johns-Manville, Inc.—The Superex insulating blocks in both rotary kilns, the C-22 bricks and the Sil-O-Cal powder lining the drier oven, the Insulkote and insulating cement on the lime kiln stack, and some magnesia pipe covering.

Judson-Pacific Co.—Pacific 8-ton crane.

Leeds & Northrup Co.—Six Micromax recording pyrometers.



The automatic-throwout pulverizer and attached separator for grinding lime used in magnesite manufacture.

Link-Belt Co.—The two kiln screw-feeders, the belt-conveyors and bucket-elevators, some silent-chain drives, and one of the car-pullers.

Novo Engine Co.—The shell-car puller.

Oliver United Filters, Inc.—The 9 Oliver-Sabin pumps used to handle the magnesium-hydroxide and gypsum underflow sludges, and the two filters.

Pacific Electric Motor Co.—The electrical installation.

Pacific Pipe Co.—Most of the pipe and all the railing installation.

Pan-American Engineering Co.—Two Simplex oil-burners, and blowers.

Parsons Engineering Corp.—Automatic scales.

Raymond Impact Pulverizer Co.—Lime grinder and Whizzer separator, gypsum kiln mill and flash drying system, and the beater mill in the commercial-lime plant.

Sterling Pump Co.—The well-pumps and some of the solution pumps.

Stockton Fire Brick Co.—Some of the kiln lining and all the red bricks.

Taylor Instrument Co.—Five flow controllers for the bitterns and water.

Traylor Engineering & Mfg. Co.—The two rotary kilns and the two rotary coolers, the double-roll 14-in. by 30-in. crusher, and the rolling barrel.

U. S. Electrical Mfg. Co.—All the electric motors and most of the motor-reducers and variable-speed motor-reducers.

Walworth Mfg. Co.—Most of the valves.

Westinghouse Electric & Mfg. Co.—Some special switches and all the transformers.

Worthington Pump Co.—The two fuel-oil pumps and the two piston-type fuel meters.

Cooke (from page 40)

with Texrope drive. The discharge pressure generated by the mill on the inclosed dust-tight circuit was such that an air vent was necessary to relieve it.

The chutes, screw-conveyor and elevator were furnished by the Jeffrey Mfg. Co. The screw is 12 in. in diameter and about 90 ft. long in a continuous horizontal flight. At its feed end the diameter is reduced to 9 in. for a length of 3 ft. in order to avoid choking. The spiral shaft is driven at 50 r. p. m. by a 5-hp., 1,750-r. p. m. motor through a Falk parallel-shaft herring-bone speed-reducer with chain and sprockets. The drive is mounted on a steel bracket attached to the elevator casing. The conveyor trough is of $\frac{3}{16}$-in. steel with a No. 14 gage dust-tight cover plate. The gate controlling the feed to the mill is a rack-and-pinion curved slide valve. The thrust collar is ball-bearing.

The elevator is a vertical continuous-bucket type about 44 ft. between centers with the head shaft operating at 20 r. p. m., using 12-in. by 6-in. by 11¼-in. No. 12 gage steel buckets on No. 110 Hercules chain. The casing is dust-tight of No. 10 gage steel. The drive, mounted on the head platform and reached by a ladder with a safety cage, consists of a 3-hp., 1,200-r. p. m. motor and a Boston Gear Works worm-gear speed-reducer with chain and sprockets.

The loading bin is 12 ft. in diameter and rises to an over-all height of 30 ft. It has a capacity of 50 tons of ground burned lime. As the bin extends through the shed roof, its upper portion is exposed to the weather, so that weather-tightness was essential. To accomplish this and to minimize air slaking of the contents, all the bin seams were rivetted after first coating the contact surfaces with a paste of red lead and putty. The bin discharges directly into a Bates 3-tube packer attached to the apex of its conical bottom. It was fabricated by the New York Central Iron Works of Hagerstown, Md., and erected by the owners' forces.

Provision has been made for the installation of a belt-conveyor to carry the loaded bags to an adjacent storage shed, should such additional bagged storage become necessary. The packer is so located that the operator may conveniently place the loaded bags either on this conveyor or upon hand trucks for immediate shipment via cars or motor trucks.

In operation the plant appears to be satisfactory. Early runs of ground burned lime are yielding about 12 tons per hr. of the following analysis:

100 per cent.	through 10-mesh
93 per cent.	through 20-mesh
70 per cent.	through 60-mesh
55 to 60 per cent.	through 100-mesh

The plant was designed by F. Lester Simon, C. E., of Baltimore, Md.

Magnesite Consumption Reaches All-Time High

Paralleling the increase in open-hearth steel-making activity, the apparent consumption of dead-burned magnesite for refractory uses increased 5 per cent. in 1937 to a new all-time record. The oncoming recession, however, fell first upon domestic mines, and operations in Washington and California were curtailed in November and December so drastically as to overbalance substantial gains during the first 10 months, reversing the uptrend since 1934. The total for the year, acording to the Bureau of Mines, was a little short of the 1936 output although far ahead of that of any previous year since 1920. Imports dwindled more slowly during the last two months, and registered a large net increase for the year.

Minor increases were noted in the sales of magnesite other than dead-burned but the tonnage of these items is too small to affect the general picture substantially. Of the 203,437 short tons of crude magnesite produced by American mines in 1937, only 1,952 tons valued at $29,203 was sold crude and sales of caustic calcined magnesite of domestic origin were only 10,031 tons valued at $311,326. Shipments of dead-burned domestic magnesite were 83,204 tons valued at $1,598,336 in 1937, compared with 89,979 tons valued at $1,713,527 in 1936. Imports in 1937 comprised 35 tons of crude, 2,798 tons of caustic calcined, and 56,021 tons of dead-burned magnesite, compared with 59 tons, 2,196 tons, and 42,608 tons, respectively, during the preceding year.

The outstanding feature of the import situation is the sudden importance of Manchurian magnesite. As recently as 1924, the production of magnesite in Manchuria amounted to only 10,000 tons and most of the rapid growth in the industry in that region has occurred since 1932. The first shipments to the United States were made late in 1936, imports amounting to 1,288 short tons being recorded from Kwantung in that year, but in 1937 the total was 21,395 tons of which the official import statistics credit 3,421 tons to China and 17,774 tons to Kwantung.

Few Plants Recover Carbon Dioxide

Enormous quantities of CO_2, approximately 4,200 tons daily in the United States, are discharged from lime kilns, and although utilization thereof has long been discussed, very few plants are equipped for its recovery, chiefly because the gas is quite impure, the U. S. Bureau of Mines points out. By the Gillette process, developed a few years ago, limestone is calcined so that the relatively pure CO_2 from the stone is not contaminated with the fuel gases. A lime plant built recently in Australia has CO_2 recovery equipment designed on an entirely different principle. The kiln gases, no matter how impure, are passed through absorption towers, where they come in contact with a solution of potassium carbonate with which the CO_2 unites to form potassium bicarbonate. When the latter is heated to 80 deg. C. it decomposes, setting the CO_2 free, and the potassium carbonate is returned to the towers for another cycle. The present extensive use of solid CO_2 encourages more active steps toward recovery from lime kilns in the United States.

The Belle Isle Lime Co., Detroit, Mich., is operating a limestone preheater that increases fuel efficiency very greatly. The ordinary rotary lime kiln utilizes the heat of the gases from about 2500 deg. F. to about 1250 deg. F.; thus about one-half of the heat goes up the stack. The new preheater not only recovers about 70 per cent. of the heat in the waste gases but adds greatly to kiln output because almost the entire length of the rotary kiln becomes a calcining zone.

A record output of 75 tons of lime a day from a single gas kiln has been attained by the Peerless White Lime Co., St. Genevieve, Mo. The kiln has a patented center burner at one level and a set of external burners at a higher level.

Gypsum Sales Down in Last 1937 Quarter

Production and sales of gypsum and gypsum products in the October-December quarter of 1937 show declines in most of the important classifications ranging up to 58 per cent. from the corresponding quarter of 1936. Notwithstanding a 10 per cent. increase in imports, the apparent supply of crude gypsum decreased to 867,934 tons in the final quarter from 955,634 tons in the corresponding 1936 quarter, a decline of 9 per cent.

A mixture of sand, small gravel, and pea gravel is used in the Pueblo, Colo., smelters of the Colorado Fuel & Iron Co. The mixing is done as the trucks are loaded by this Trackson high shovel mounted on a Caterpillar Diesel tractor, which loads from three piles 60 ft. apart at the storage yard of the Pueblo Sand & Gravel Co. Trucks are loaded at the rate of 50 cu. yd. per hr.

Propose Specifications for Road Materials

One of the important actions approved at the meeting of Committee D-4 on Road and Paving Materials, during A.S.T.M. Committee Week in Rochester, March 7 to 11, was the recommendation involving a new method of test for determining the particle-size distribution of fine and coarse aggregates using sieves with square openings, to be published as tentative. Although the method is also applicable to the use of laboratory screens with round openings it is not intended for use in the sieve analysis of aggregates recovered from bituminous mixtures. This proposed standard was prepared by a joint conference committee representing Committee C-9 on Concrete and Concrete Aggregates and Committee D-4, under the chairmanship of E. F. Kelly, Chief, Division of Tests, U. S. Bureau of Public Roads. It is intended to replace four existing standard methods covering the mechanical analysis of aggregates issued under the A.S.T.M. designations: C 41, D 7, D 18 and D 19.

The subcommittee on tar products presented proposed new tentative specifications for tar which include detailed purchase requirements for 14 grades of tars used in road construction. These comprehensive specifications are intended to replace four existing specifications. The grades of tar covered by the new specifications are intended for use as priming coat; priming coat and surface treatment; surface treatment and road mix; surface treatment, road mix, premix and seal coat; surface treatment, premix, seal coat, penetration and crack filler; surface treatment, road mix and premix, when low temperature application and quick setting are desired.

The subcommittee on waterbound and traffic-bound roads presented two new proposed tentative specifications covering respectively crushed stone and crushed slag for waterbound base and surface course. These specifications were approved for reference to the Society at the annual meeting in June.

The group concerned with bituminous macadam surfaces and bases submitted to the committee two new tentative specifications for crushed stone and crushed slag, respectively, intended for bituminous macadam base and surface course, which after letter ballot approval of the committee will be recommended to the Society to replace the existing specifications.

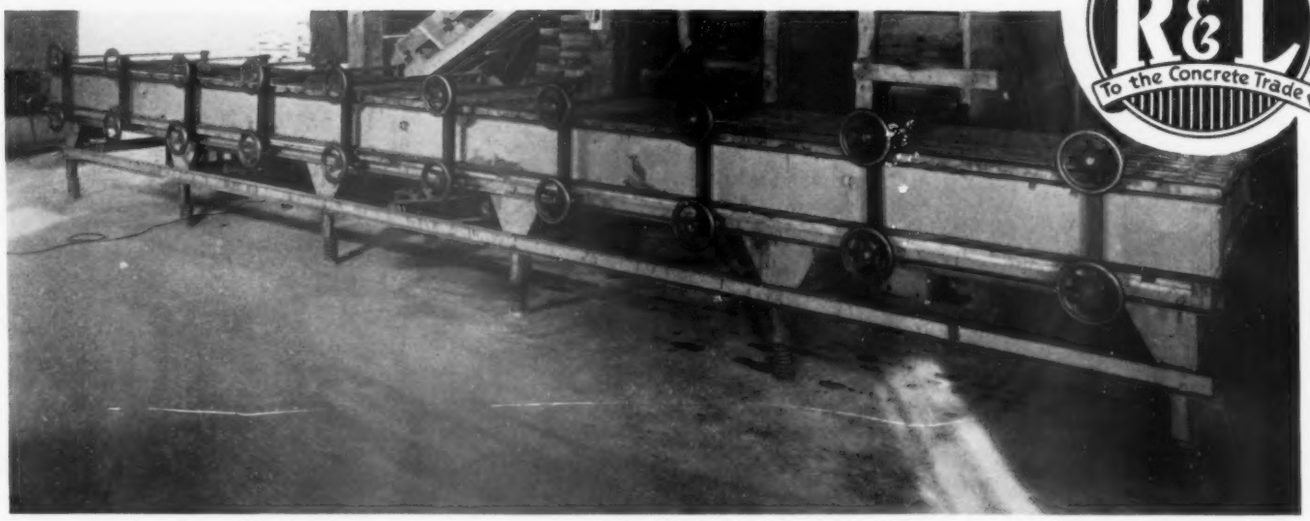
Two new specifications for crushed slag and for crushed stone, respectively, for bituminous-concrete base and surface courses were reported by the subcommittee on hot-mix bituminous surfaces and bases.

As the result of coöperative studies carried on during the year, the committee has prepared several revisions of the Tentative Method of Test for Abrasion of Coarse Aggregate by Use of the Los Angeles Rattler (C 131—37 T). The committee accepted for publication as tentative several proposed revisions in the Standard Method of Test for Ductility of Bituminous Materials (D 113—35) which will be published during the year. The tentative revisions of the Standard Method of Test for Softening Point of Tar Products (Cube-in-Water Method) (D 61—24) which have been published during the past year will be recommended in June for adoption.

PROFITABLE NEW PRODUCTS

Special Section

BELOW—The R & L Concrete Joist Machine in Paul Bohm's Concrete Products Corp. plant at South Bend, Ind.



Over 30 Years of Service
R & L
To the Concrete Trade

How would YOU like to sell a MILE of CONCRETE JOIST in a SINGLE JOB? Paul Bohm of South Bend, Indiana, did it with R & L Joists.

Another user tells us his concrete masonry business increased 200% in a year's time when he added concrete joists to his line.

The manufacture of concrete joists opens up an untapped market for you . . . one that is growing by leaps and bounds.

R & L Joist and Floor Slab Gang Molds make an ideal combination. You can use the Vibrating Table for many other products such as Concrete Block and Partition Tile, Sills and Lintels, Stair Treads, Fence Posts, etc.

The R & L Vibration System is flexible . . . adaptable to anything you want to make . . . and turns out products of unsurpassed density, quality and appearance. It is the successor to the high-priced stripper.

Thirty-five years of continuous manufacturing service to the concrete industry enables us to offer you practical, time-tested equipment, backed by a complete plant-engineering service to assist you in working out plant layout and handling problems.

Write now for information.

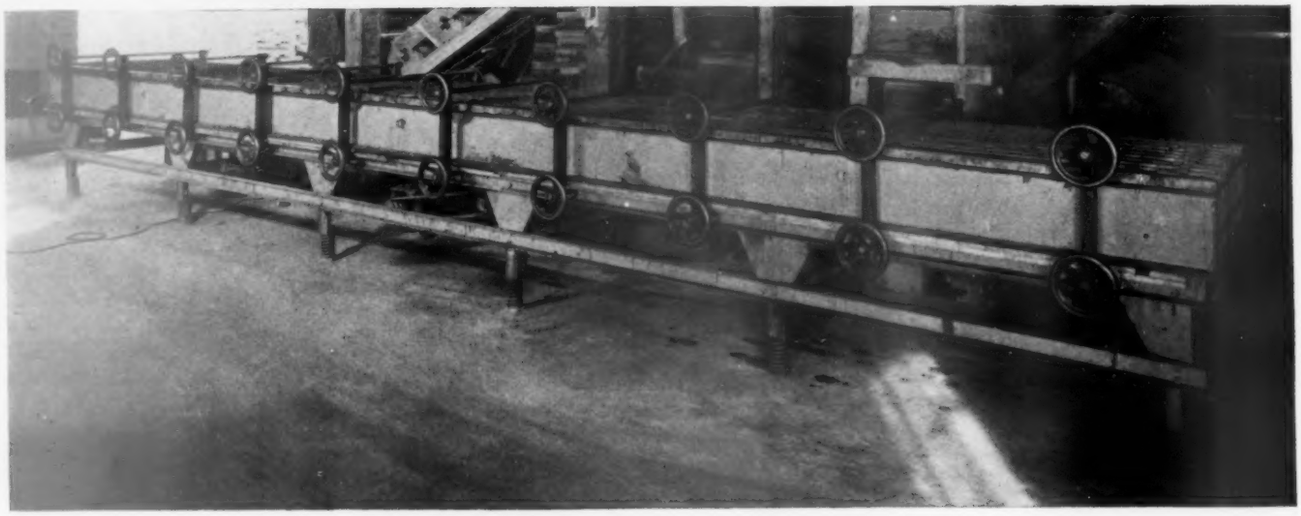
We also manufacture the famous R & L line of Concrete Pipe Machines, Pipe Molds, Conduit Molds, etc.

R & L CONCRETE MACHINERY CO.

KENDALLVILLE, IND.

By HARRY F. UTLEY

A Mile of Concrete Joists on a Single Job!



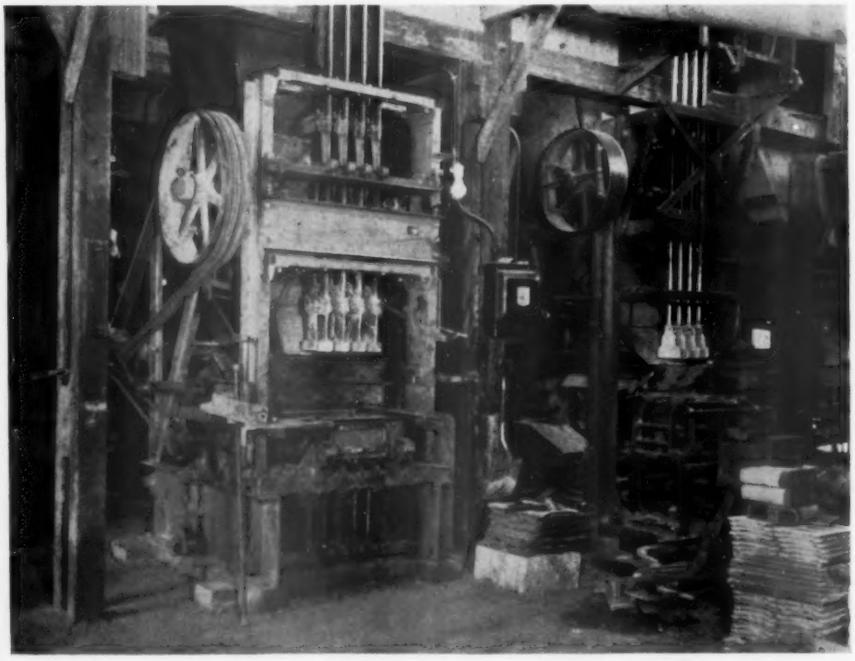
Machine which produces vibrated-concrete joists at the plant of Concrete Products Corp., South Bend, Ind.

AGGRESSIVE merchandising, plus 18 years in the business of producing concrete products of the highest quality, have won for the Concrete Products Corp. of South Bend, Ind., an enviable position in that area. Architects and builders have come to know that they can depend upon the strength, durability and uniformity of the units produced by this concern and in numerous instances specifications writers, in setting up standards for the concrete-building units to be used in a particular job, have included in the specifications a clause stipulating that such units be "of the quality made by Concrete Products Corp., South Bend, Ind., or equal."

The head of the company is Paul E. Bohm, who succeeded to full ownership about eight years ago following the death of his father. The plant is located high on a glacial moraine on the eastern outskirts of South Bend and overlooks the St. Joseph River Valley, with the golden dome of Notre Dame visible from the opposite heights. An excellent gravel deposit adjoins the plant, a hoist and drag-scraper excavating the material, which is screened in a tower at the plant for utilization in the manufacture of the various types of units. In addition to gravel-concrete units, the company makes Waylite blocks, cinder blocks and bricks. The annual capacity is about 500,000 units, most of these being produced on a Stearns oscillating stripper which was installed in the autumn of last year. Two older strippers, one a Hobbs, the other an Anchor, are used occasionally when production demand is heavy. The Anchor machine is now being converted, however, for exclusive use as a brick-making unit.

A little more than a year ago Mr. Bohm became interested in the possibilities of concrete joists and in April, 1937 installed a Crescent joist machine, made by the R & L Concrete Machinery Co. of Kendallville, Ind. This equipment casts 10 reinforced-concrete joists of standard I-beam design at one time. A vibrator, firmly bolted beneath the joist machine, accomplishes what tamping, puddling and spading often failed to do with earlier equipment. Not only does vibrating produce a denser joist of maximum strength and completely-filled voids, but the surface of the finished product is strikingly smooth and remarkably uniform in appearance and texture.

Concrete for both masonry units and joists is prepared in an Ideal 14-cu. ft. mixer. The practice at this plant



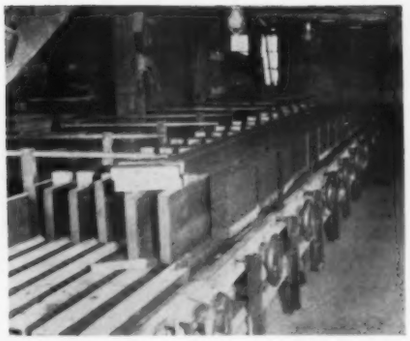
New stripper which turns out oscillated blocks. One of the older machines is at the right.

A view of the plant showing belt-conveyor from screening tower and some of the yard storage.

is to use high-early-strength cement exclusively. This allows the removal of all units from the steam-curing rooms after 48 hr. Twice as much curing time would be necessary were ordinary Portland cement used. This advantage, especially when production schedules are heavy, is readily apparent and, according to Mr. Bohm, the added cost of the high-early-strength cement is easily justified. The maximum size of coarse aggregate used is ½ in. and 3½ gal. of water per sack of cement is employed. Test cylinders, made during a pour of a joist order, were broken recently by the Robert W. Hunt Co., the 14-day cylinders testing 3,500 lb., while after 28 days curing tests indicated an average strength of 5,365 lb.

Shortly after the joist machine was installed a prominent South Bend architect designed a new residence for his own occupancy. Concrete joists were employed in the concrete floors of the building and Mr. Bohm landed his first order. The joists, left exposed, present a striking appearance, somewhat similar to beamed-ceiling design. After this first job, Mr. Bohm

Drag-scraper in pit adjoining plant.

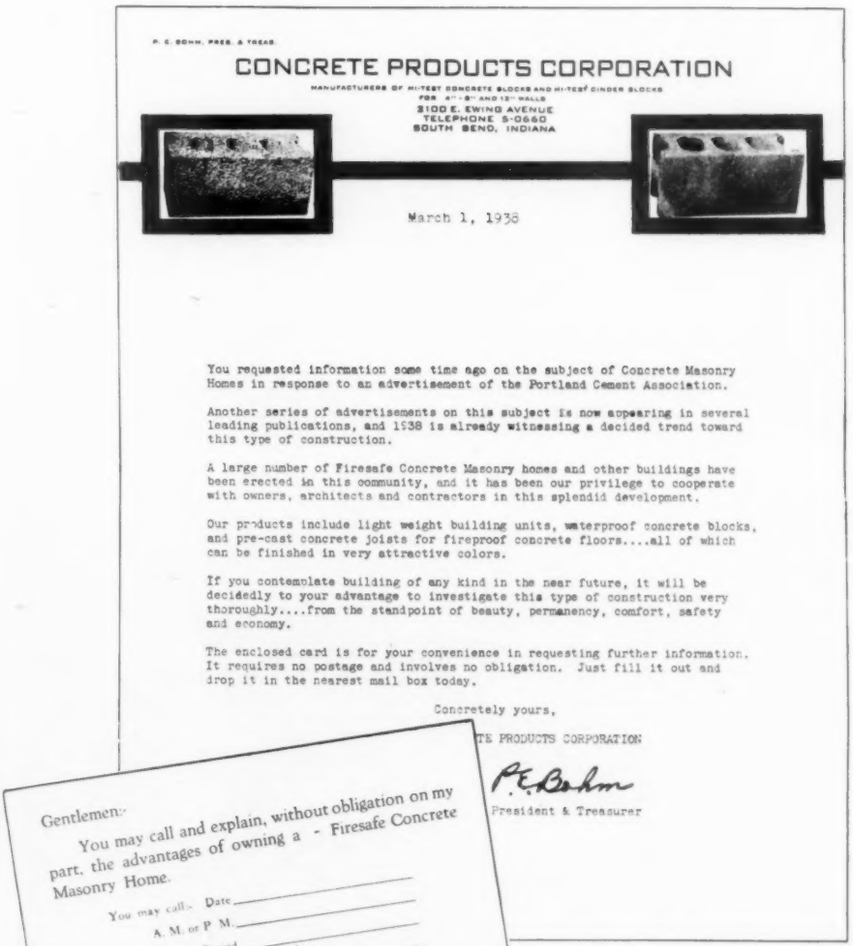


Using wooden forms, Mr. Bohm also uses the joist machine to produce special type of cinder building units.

really "went to town" with the concrete-joist business. In less than a year he has supplied joists for eleven residences and more than a score of store buildings, filling stations, etc.

When fire practically destroyed the two-story Baugo Township School near Elkhart, Ind., the authorities decided to prevent a similar occurrence in the future by rebuilding it with fireproof materials. Mr. Bohm won this job and has been busy this spring

(Continued on page 69)



P. E. BOHM, PRES. & TREAS.

CONCRETE PRODUCTS CORPORATION

MANUFACTURERS OF HI-TEST CONCRETE BLOCKS AND HI-TEST CINDER BLOCKS FOR 4"-8" AND 12" WALLS

2100 E. EWING AVENUE
TELEPHONE 5-0660
SOUTH BEND, INDIANA

March 1, 1938

You requested information some time ago on the subject of Concrete Masonry Homes in response to an advertisement of the Portland Cement Association.

Another series of advertisements on this subject is now appearing in several leading publications, and 1938 is already witnessing a decided trend toward this type of construction.

A large number of Firesafe Concrete Masonry homes and other buildings have been erected in this community, and it has been our privilege to cooperate with owners, architects and contractors in this splendid development.

Our products include light weight building units, waterproof concrete blocks, and pre-cast concrete joists for fireproof concrete floors....all of which can be finished in very attractive colors.

If you contemplate building of any kind in the near future, it will be decidedly to your advantage to investigate this type of construction very thoroughly....from the standpoint of beauty, permanency, comfort, safety and economy.

The enclosed card is for your convenience in requesting further information. It requires no postage and involves no obligation. Just fill it out and drop it in the nearest mail box today.

Concretely yours,

TE PRODUCTS CORPORATION

P. E. Bohm

President & Treasurer

Gentlemen:

You may call and explain, without obligation on my part, the advantages of owning a - Firesafe Concrete Masonry Home.

You may call: Date _____

A. M. or P. M. _____

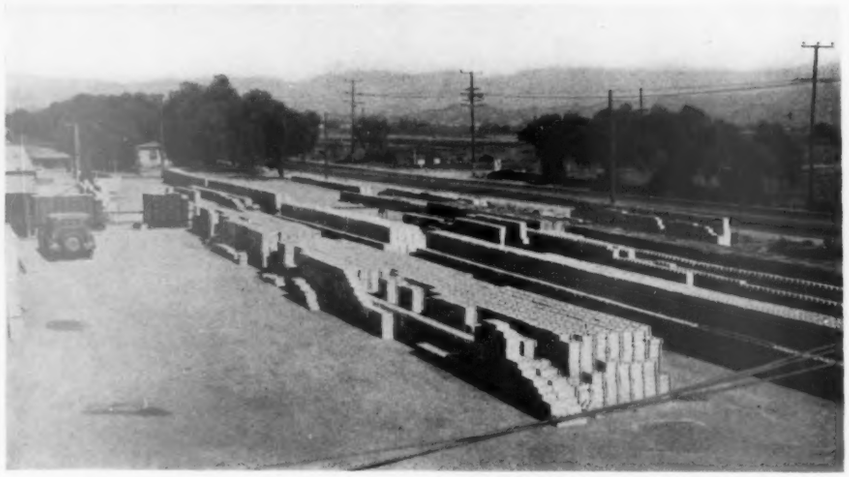
Signed _____

Address _____

If will be interested in the future, please send me your booklet

Form letter and return postcard used to follow up inquiries produced by advertising.

PROFITABLE NEW PRODUCTS



Storage yard at the Hollostone Co. plant in Hollywood, Cal.

By W. E. TRAUFFER

NEW CONCRETE UNITS FROM MOVIELAND

Concrete is compacted entirely by vibration in the machine, no tamping being employed.

The roller conveyor which carries the palleted units from the machine to the yard.

BACK in 1925 when M. L. White formed the Hollostone Co. and built a small concrete-products plant in North Hollywood, Cal., he had no idea that he would one day also be a manufacturer of concrete-products machinery. The concrete-tile machine he installed at that time was a make well-known on the Pacific coast. By 1929, however, a machine of larger capacity and greater flexibility was needed and one was purchased by Mr. White. This machine also failed to meet his specifications and was replaced in 1935 by a machine on which he had been working for some years. Experience with this machine suggested further improvements and another machine was built embodying these. This process was repeated with another machine installed in December, 1936 and again with one which was just recently installed. This last machine, Mr. White believes, will require only minor improvements for many years to come. It is thoroughly covered by patents.

The Hollostone machine now made by Mr. White is a simple and sturdy unit which can make 4-in. by 4-in. by 12-in., 4-in. by 6-in. by 12-in., 4-in. by 8-in. by 12-in. and 4-in. by 12-in. by 12-in. blocks or tiles. With one man operating the machine and another operating the mixer and moving the blocks to storage 2,500 to 2,600 of the 8-in. tiles can easily be made in an 8-hr. day. As three of these tiles make 1 sq. ft. of wall, this means 800 to 900 sq. ft. of 8-in. wall daily. With only one man about half this number can be produced as the operator must then take care of mixing the concrete and storing the blocks. This machine made over 900,000 blocks in 1937. Sixteen different

types of blocks have been made on it. Blocks 8 in. high and 16 in. long can also be made with this machine, but the 4-in. size is most popular in California as it is more adaptable and gives the architects more latitude.

The Hollostone plant is located at 7151 Lankershim Blvd., North Hollywood, Cal., near one of the largest sand-and-gravel producing centers serving the Los Angeles area. Sand and pea gravel are dumped from trucks on a ramp into bins. These materials are discharged through slide gates on individual belt-conveyors feeding volume-measuring boxes. These boxes discharge the ingredients for a batch into a 14-cu. ft. drum mixer where cement and water are added.

The concrete is discharged on another belt-conveyor which is wide and long enough to hold one batch while another is being mixed. The tile-machine operator can start and stop this conveyor thus being in control of the feed of concrete into the hopper of the machine without interferring with the mixer man's control of the dumping of his load from the mixer.

This block machine depends entirely on vibration to compact the concrete and when the mold is inverted the discharge of the block is assisted by vibration in conjunction with a device which simultaneously carries downward the pallet on which the extruded tile rests. At the point where the tile clears the mold the pallet rests on a receiving chain-conveyor under the mold, which carries it to the roller-conveyor, leading to yard storage. The vibrating mechanism is operated by a 2-hp. motor and the chain-conveyor by a 1/8-hp. motor-reducer.

There is outdoor storage space for 500,000 blocks and Mr. White believes in keeping the yard at least half full at all times. After experimenting with sprays with unsatisfactory results he has developed a system of covering the piles of blocks with burlap bags within 10 min. after they are piled and keeping these bags soaked. With his machine and curing methods, he consistently turns out 2,500-lb. blocks with a mix of 1:10 or about 1:5:5. About 5 gal. of water are used per sack of cement which gives a concrete that has almost no slump but "puddles" when vibrated.

The complete plant supplied by Mr. White includes the mixer, conveyors, the block machine with a full set of interchangeable molds and the chain-conveyor. Only the block machine and the chain-conveyor are made by Mr. White and these units are also available separately. Where two or more machines are used, concrete is supplied from the same mixer and conveying system. Molds can be supplied to make blocks of any desired size or shape up to the largest that can be handled by hand. Molds can also be made to order for any desired special shapes. Molds can be changed in from 6 to 8 min.

The machine is simple and compact in design with only 3 or 4 moving parts and its weight—with motors, molds, etc.—is about 1,500 lb. As it is made almost entirely of structural steel repairs can be made quickly by a welder without the delays incident to waiting for repair parts. According to Mr. White, one of his machines was operated for 2 years at a total cost for repairs of less than $10.

Joists *from page 67*

supplying the joists for the floors. The joists on this order alone, if laid end to end, would be nearly a mile long!

Because he and his products are so well known among architects and contractors, Mr. Bohm does much of his selling by personal contact. He also regularly employs one salesman, who follows up leads as they develop. Literature prepared by the Portland Cement Assn. and carrying the imprint of the company is used, both for mailing and to supplement personal solicitation. National magazine advertising of the Portland Cement Assn. develops other potential sales, the association turning over the names of persons who write for booklets and other information about concrete to reputable products manufacturers such as Mr. Bohm. A form letter which the company is sending out to these prospects this year, together with a return post-card of the no-postage-required type, are reproduced here. It has been the means of getting several nice orders for the firm's products.

Mica Important Part of Asphalt Shingle

Notwithstanding its high cost per ton, currently $25 to $30, dry-ground mica is one of the most inexpensive coating materials for asphalt roofing, the Bureau of Mines points out. Ordinary roll roofing requires only 0.57 lb. of mica per roll, although proportions may range all the way from 0.4 to 1 lb. As talc is more porous, 6 lb. have to be used to afford equal protection against sticking, and at the same time it absorbs unnecessarily a certain amount of asphalt costing $15 a ton. For making asphalt shingles, greater quantities of mica tend to make a stiffer and otherwise superior product and at the same time reduce the amount of felt, so that 52-point instead of 90-point felt can be used. On this new type of shingle, 23 lb. of mica per 100-ft. square, costing a little over $30 a ton, will replace 23 lb. of felt costing $50 a ton. The saving is not quite in the same proportion, inasmuch as manufacturing costs tend to be a trifle higher (though possibly not enough higher to offset the superior quality of the product). Other materials required per square include 66 lb. of asphalt at around $15 a ton, 48 lb. of saturating oil at around $18 a ton, and 48 lb. of granules at, say, $12 a ton. (Paul M. Tyler, Bureau of Mines.)

Concrete joists used in the plant garage enable prospective customers to see just how they are utilized.

By D. R. (Spec) COLLINS

ROWE WHITE and the SEVEN MENTAL GIANTS

...when these bugaboos were overcome sales reached a new high

DURING the past year I've been hearing some rather amazing stories about the sales prowess of a friend of mine—Rowe White.[1] Rowe has been in the concrete products business for four years now, but up to 1937 his business might have been considered as "just another concrete-products plant". Located in a rather competitive market Rowe's sales, until 1937, were anything but spectacular. In fact many of us wondered how he ever made the grade, ever managed to keep going.

But 1937 proved to be a different story. Rowe's business has "zoomed" and soared. He has become, almost over night, the leading producer in his market. His plant has been running two shifts a greater part of the year. He has had to install new equipment to keep a balance between sales and production. He has become the talk not only of the town, but of the section of the country, where he is located.

During the National Concrete Masonry session in Chicago last February I backed Rowe into a corner, bent on finding the reason for this sudden turn in his affairs. "How in the world did you do it, Rowe?" I asked. The story that follows is his. It demonstrates what can be done when a man takes stock of his weakness, and then acts to overcome them.

"I came to the convention here in Chicago a year ago rather unwillingly. Frankly, I was a bit scared to come, but at the same time I wanted to know what it was all about. I was really afraid to associate with so many people who knew more, or who I thought knew more, about the concrete-products business than I did. I just didn't want to expose my dumbness to so many people. But I thought I'd have a whirl at it. I'd never been to a convention before and I needed to get away from the plant for a while. Well, I found that most of the men I met in Chicago were just ordinary folks like myself. Most of them seemed more prosperous and more successful, though. It didn't take me long to find out why. Most of them spent the greater share of their time out selling.

"Going home on the train I had a little time to do some serious reflecting. One fellow in particular had got under my hide. I got to thinking, 'If that bird can do all the business he says he does, and other people say he does, why can't I'. That started it. I took myself to pieces the rest of the way home. I realized that I had a product that couldn't be beaten for quality in my town, but I just hadn't done a good job of selling it. I'd been scared to sell—ducked out of it every time I possibly could—spent far too much time puttering around the plant instead of out where jobs were to be had. And during the course of this self-analysis I made a list of the things I'd have to overcome if I was going to do a real job of selling my products during 1937.

"Every one of these things hinged on my making of a better salesman of

[1]Because of the unwillingness of the subject of this story to have his name used the name Rowe White has been substituted and is fictitious.

myself. Every one of them was simply a mental hazard. Every one *could* be overcome. And I felt confident that if I *could* overcome them I could be as successful in a financal way as the men I'd envied in Chicago at the convention. Here are the things that I figured I'd have to overcome really to 'go to town' as a successful concrete-products salesman.

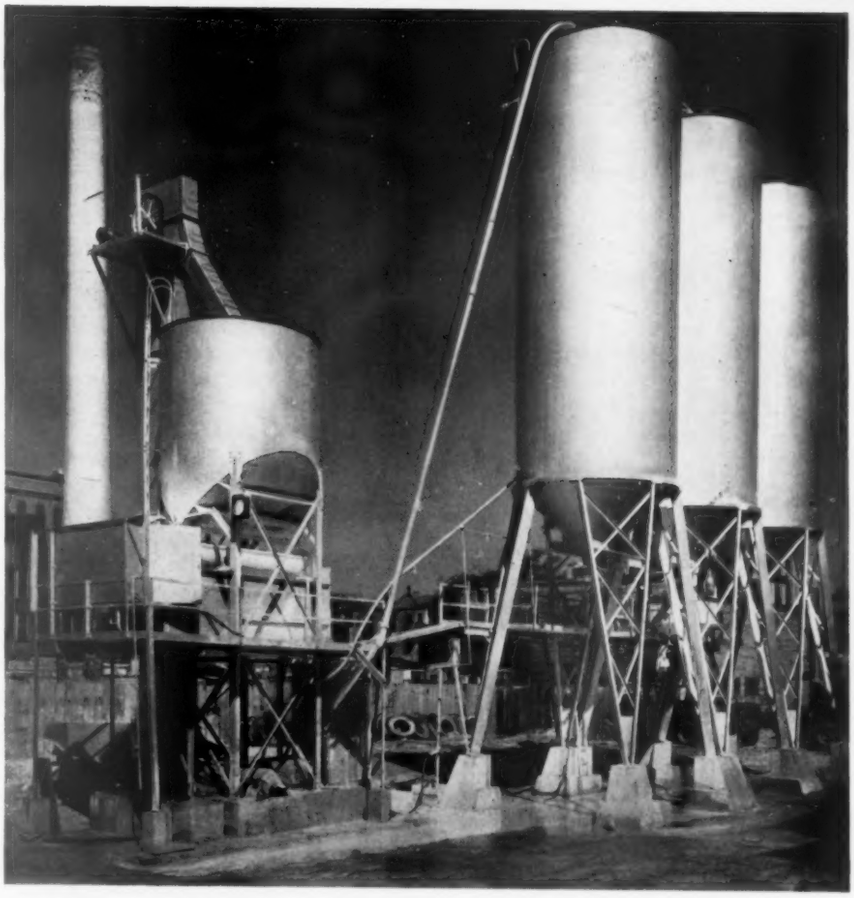
"1. The fear-complex.
"2. Criticizing my competitors.
"3. Talking 'around' my product.
"4. Negative selling.
"5. No follow through on sales.
"6. Failure to check up on jobs.
"7. The price-complex.

"Let's take them, one by one, and see what I *was* doing and what I *should be* doing—in short, why I wasn't making sales. And while I'm doing that let me suggest some of the remedies that I applied to secure the best years business I've ever had.

The Fear-Complex.—"I had the fear complex in an overgenerous dose. I didn't like to *sell*, didn't like to meet people. Yet, because I couldn't afford to hire a salesman I had to be my own business getter. And how I hated it! Every morning before I started my rounds I'd sit in the car and have a first-class case of stage fright. And when I'd get out on the job I'd blush and stammer and stutter. I was actually afraid to ask for an order for fear of being turned down. I was licked before I started.

"Thinking it over I came to the realization that, after all, my prospects expected me to ask for an order. Certainly they weren't going to volunteer to give it to me. And I realized that I knew as much as, or more than, any prospect what my product would do for him from a profit angle. If I could overcome this fear, work myself into a *selling*-complex and start really to ask for orders, I was certain I'd get a lot more business. I just said to myself, 'Why I know more about this business than any man in town. I've got a better product than anyone else, and, believe me, I'm going to *sell* it. I'm going to lick that old fear and timidity.' Well, you know, I started to click right from the first. And it was surprising how my other troubles started to vanish.

Criticizing My Competitors. — "I realized, too, that I was worrying more about my competitors and spending more time in tearing them down than I was in selling my own products. My competitors had something I didn't have—a limited amount of sales sense—but I was too blind to see that. What I was really doing was alibing



Contractors are re-discovering
Lime Mortar and Plaster
made with Aged Lime Putty

The Brooks-Taylor Lime Putty Plant is a complete unit for producing and handling aged lime putty. Dry lime is elevated to a storage bin, slaked mechanically and pumped into ageing tanks where the excess water is removed by means of special filters. The finished putty is withdrawn from the ageing tanks into a measuring batcher and dumped into delivery trucks by gravity.

During the past few years, contractors have sacrificed the advantages of lime mortar and plaster for speed, because they could not wait to age the lime on the job. Now, with the Brooks-Taylor process, fully aged lime putty is delivered to the job ready for use.

The correct slaking temperature is determined for the particular type of quick lime used. After this is done, the lime is slaked under thermal control, without regard to the proportions of water and lime used. This gives assurance that the lime is completely and properly slaked and that it will provide the highest plasticity and the maximum putty yield. Every batch is slaked, in exactly the same manner, assuring uniformity. Unslaked lumps and foreign particles are screened from the putty. After being thoroughly aged, the putty can be kept at the proper consistency in the tanks for long periods of time if necessary.

For further information on the Brooks-Taylor process or equipment, address either the Brooks-Taylor Company, Birmingham, Ala. or the nearest office listed below.

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Chicago . . . . . 2451 Old Colony Bldg.
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Boston . . . . . 1550 Consolidated Gas Bldg.
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Tulsa . . . . . 1648 Hunt Bldg.
Birmingham . . . . . 1503 North Fiftieth St.
Dallas . . . . . 1486 Liberty Bank Bldg.
Detroit . . . . . 1552 Lafayette Bldg.
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B-575 **Plants at BIRMINGHAM, CHICAGO and GREENVILLE, PA.**

my own stupidity by running down my competitors. And at the same time I was making my prospects curious about my competitor and his product, and cutting my own throat while I was doing it. My prospects certainly weren't interested in hearing me damn the other fellow and his product. They had plenty of troubles of their own. I was simply making a monkey out of myself. I decided to stick to my knitting and let the other fellow stick to his. I forgot my competitors as such. After all *my* business was to sell *my* product. I had a good one, and when I concentrated on *it*, my sales started to come up. You'd be surprised how much satisfaction you can get out of selling when you can really get this idea across to yourself.

Talking Around the Product. — "One thing I certainly had not been doing—keeping my conversation to my product, its use and the *profit possibilities* its use would give my prospect. Don't miss those words 'profit possibilities'. They spell a theme that is the sweetest song you can sing to any prospect. But I was talking, as I look at it to-day, about everything else under the sun. And I was letting my prospects either completely derail my sales arguments or sidetrack them so they were of no value. The smart salesman who kept his story on the main line was the fellow who was getting the business. I determined to keep a close watch on my own and my prospects' conversational meanderings—to keep my selling talk on the main line always. You'll be surprised how many more calls per day you can make when you follow this process, and how many more sales per call you can make.

Negative Selling. — "We all kid about the concrete-products salesman who says, 'You *don't* want any blocks to-day, do you'. But I wonder just how many of us are guilty of these same tactics unconsciously. My face became as colorful as a big red apple when I got to thinking how many times I'd kissed away an order with a negative approach. I wonder now how I could have been so dumb as to say, limply, 'Don't you think you ought to give me this job', when a simple, positive, straightforward, 'When can I make delivery?', might have been the difference between getting and losing. After I learned to direct my statements in a positive manner, that called for a positive, affirmative answer, I found I was getting more orders.

No Follow Through On Sales.—"I wasn't following through on my job of selling. Probably it was because I was scared to see and talk to people. But I know now that a lot of this neglect was simply poor planning. I can look back now and see that dozens of times I must have had prospects worked up to the point of giving me their next job, then because I had no follow-up system worked out, and didn't *happen* to see them in my daily rounds, the job that should have gone to me went to someone else. I'll say this, if a prospect is worth calling on more than once he is generally worth following through. I used to call on a man three or four times, then get discouraged. I was always amazed when he shifted his business to a new source of supply and hadn't given that business to me. Well, business just can't be had that way nowadays. Some other salesman with more patience and a real follow-up system usually got those jobs. When I developed and followed a routine follow-up system I found it productive of a nice amount of new business.

Failure to Check Jobs.—"There's an old proverb that reads something like this, 'There's no use running for a street car after you've caught it'. That doesn't apply to the concrete-products business. I probably 'ran' like the very devil to get the initial order from some desirable customer, then as soon as delivery was started forgot all about him until he had something else coming up. I didn't realize that it is human nature to demand attention now and then, even though deliveries *were* going out in fine shape. I hadn't even thought that being of more-than-ordinary service to my customers was the best way of exposing myself to more orders. A tremendous change for the better came over my business, when I started to check up on jobs that were being delivered. I saw to it that every job was shipped just when the customer wanted it, that the right number of corner blocks and fractionals went with every load, that *my* customers never had to wait for blocks, that they were getting the sizes and quantities in the proper order to allow them to do the job quickly and economically. How dumb I had been, and blind too, to the fact that the easiest way in the world to get *more* business is to keep and build up *old* business. Now I never give a customer a chance to complain to a competitive salesman about the kind of servce I'm rendering him. There used to be plenty of complaining against me on this score.

The Price-Complex. — "I believe that in the past 95 per cent. of the times I lost a sale I had the price-complex. My first thought always was, 'Some so-and-so has cut his price to get this job'. No wonder I couldn't sell, with my mind so filled with thoughts of price that I would completely forget the quality of product and the service that I could render. And I'm certain that more than once I forced the thought of price into my prospect's mind because I had the price complex myself. As soon as I got it into my head that price was a boomerang that was bound to come back and destroy me I started to make more profit. Thinking it over made me realize that customers had been taking advantage of my price-complex. And I was not only wrecking my own business by not sticking to a price that would give me a fair margin of profit, but I was wrecking the business of every one else in town. I hadn't realized that the minute I started to waver on my price I had set up the thought in the buyer's head that he could play me against someone else to get an even better price than I would give him. I didn't realize that his intimation of a better price from a competitor was simply bait. Here's what I decided; why should I solicit business on a price basis and build up trouble for myself, when I could just as well develop my prospects into customers whose orders were based on a quality product and unusual service.

"Since I came to that conclusion I've been a lot happier mentally and financially.

"Well, there are the seven things I had to lick—seven mental complexes that had held me back and stymied me for years. And when I did overcome them and went after business on the basis of *A Quality Product, Exceptional Service and Aggressive Selling* I really started to bring business my way. There's no *secret* to my success. It's simply based on licking the things that were licking me, and keeping everlastingly on the job telling my story *the way it should be told.*

Defeat Diversion Bill in South Carolina

The lower house of the South Carolina legislature defeated by a vote of 55 to 47 a bill which would have diverted from the state highway department to county treasuries 2c. of the 6-c. gasoline tax, rather than the 1c. diverted at present.

A similar bill was killed by the same legislature a year ago.

READY-MIXED CONCRETE AND MASONRY UNITS OTHER PRODUCTS

COLUMBIA CONCRETE PIPE CO.
WENATCHEE WASH.

By W. E. TRAUFFER

THE history of the Columbia Concrete Pipe Co. of Wenatchee, Wash., is an excellent illustration of the advantages of an aggregate producer in the manufacture of ready-mixed concrete and concrete products. This firm was incorporated early in 1937 as a separate company but was formerly operated as a branch of the Yakima Cement Products Co. of Yakima, Wash. It is now an affiliate of that company.

W. P. Hews, now president of the Yakima Cement Products Co., in 1922 acquired an old concrete-products plant in Yakima. Later J. R. Sherman and R. L. Ehmer, now secretary-treasurer and superintendent, respectively, acquired interests in the plant and the present name was adopted. Some years ago ready-mixed concrete was added to the products of this plant, which was rebuilt and enlarged.

In May, 1932 this company built a concrete-pipe plant in Wenatchee, using some old equipment from the Yakima plant. At that time also a sand-and-gravel plant near Wenatchee was leased and operated by the company to supply aggregates for the pipe plant and for the commercial demand in this territory. This plant is owned by the Puget Sound Power & Light Co., which built it about 14 years ago to supply aggregates used in the construction of that company's Rock Island Dam, a hydroëlectric project on the Columbia River.

Ready-mixed-concrete production was inaugurated at the Wenatchee plant in September, 1934. A ½-cu. yd. mixer and dump trucks were used. In 1937, when the Columbia Concrete Pipe Co. was formed, a new plant was built at the foot of Ninth St. in Wenatchee. The equipment from the original plant was installed and a block machine was added. A 1-cu. yd. Chain Belt Rex concrete mixer was installed in this plant and two Jaeger truck-mixers were purchased. This plant now produces ready-mixed concrete, concrete pipe, concrete building blocks, concrete bricks, septic tanks, wall curbing, pier blocks, cinder chimney blocks, stepping stones, burial vaults, precast concrete cribbing, etc.

The plant and part of the storage yard with truck backing down ramp after having discharged a load of aggregates into the plant bins.

Aggregates are received in trucks, which are driven up a wooden ramp for unloading into six storage bins. Three 25-cu. yd. bins serve a 1-cu. yd. weighing batcher in the concrete department. This batcher is equipped with Fairbanks dial scales. Cement from sacks is added in the batcher and the complete batch is discharged into the Rex 28S mixer. Water is measured by volume in a tank.

At present the plant mixer is used for the complete mixing and the two 1½-cu. yd. Jaeger truck-mixers are used as agitators. If desired, the mixing can be done in the truck-mixers and the plant mixer can be used to shrink the mixture or can be by-passed entirely. The two truck-mixers are equipped with water-measuring tanks and are independently driven by Hercules gasoline engines. They are mounted on Kenworthy truck chassis.

Deliveries have been made as much as 10 mi. distant and an average production of 15 tons per hr. can be maintained. Concrete is supplied for both large and small jobs. When a large

One of the two 1½-cu. yd. truck-mixers used by the company. The modern, air-conditioned office is in the background.

The mixer used for production of ready-mixed concrete with bin gates and batcher above.

local contract is secured dump trucks are pressed into service to increase the delivery capacity.

The three 20-cu. yd. aggregate storage-bins supply the concrete-products equipment. Aggregates are discharged from the bins into buggies, which are calibrated for volume measurement. The mixing is done in two Tuerck-Mackenzie horizontal mixers, one supplying the pipe machine and the other the block machine. These buggies also serve a ¼-cu. yd. drum-type

Another view of the block machine with roller-conveyor to yard storage at right.

mixer which supplies the hand molds used for 36-in. to 60-in. pipe and molds for other products already mentioned. During the summer pre-cast concrete cribbing was made by hand for the state highway department at the rate of 1,400 lineal ft. per day.

The Tuerck-Mackenzie pipe machine can make culvert, sewer, irrigation and drain pipe in diameters from 4 in. to 30 in. and in 2½-ft. and 3-ft. lengths. All pipes are carted in their forms into six 10-ft. by 50-ft. kilns, where they are exposed to steam and water sprays before being moved to outdoor storage.

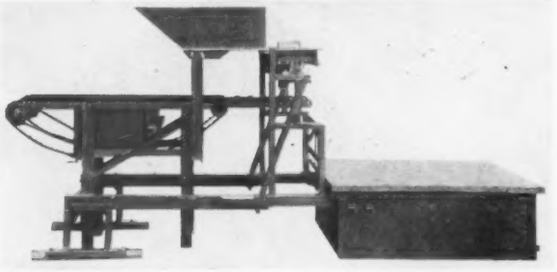
The block machine can make 4-in. by 4-in. by 12-in., 6-in. by 4-in. by 12-in. and 8-in. by 4-in. by 12-in. building blocks, and manhole blocks. With this machine 2,200 8-in. building blocks have been made in an 8-hr.

The machine used for making building and manhole blocks.

day. These products are carried on pallets on a roller conveyor to outdoor storage, where sprays assist in curing them.

One of the truck mixers being loaded in a pit beneath the plant mixer.

Most of the concrete products are shipped in trucks for local use and to points up to 150 mi. away. Truck shipments have been made to the Canadian border and to Grand Coulee Dam. Some railway shipments are also made. Two 3-ton International trucks with stake bodies are used to deliver concrete products. Two Ford V8 dump trucks are used to deliver aggregates.



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- Why not put some of that vacant Land to work?
- Make concrete tile.
- Another outlet for your material and a profit on the tile as well.
- Ask Hollostone what they can do about an inexpensive machine to start and add to as developments warrant.

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See article in this issue

Phosphate Consumption Shows Marked Recovery

Twice since the close of the World War, in 1920 and again in 1930, upward trends in shipments of phosphate rock from American mines have been turned back by adverse economic conditions from around the 4,000,000 ton level. In 1937, after rapidly rising from their post-war low point of 1932, shipments from American mines once more came close to this level before another economic downswing tended to reverse the trend. Shipments of phosphate rock from American mines in 1937, as reported by producers to the Bureau of Mines, amounted to 3,954,239 long tons valued at $12,964,193. Exports amounted last year to 1,052,802 long tons valued at $5,818,231, and imports were 13,400 long tons valued at $115,926. The apparent quantity available for domestic consumption, accordingly, was 2,914,837 long tons, almost equalling the high record of 3,034,333 tons in 1920, and topping all other years.

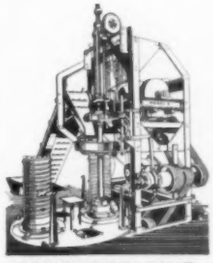
Although the consumption figure for 1937 represents marked recovery from the low point in 1932, it is about what would have been expected from the diminishing rate of increased growth indicated by the annual record just prior to the slump after 1930, thus failing to confirm, as yet, any acceleration in the rate of increase in domestic consumption. Moreover, some portion of the increased consumption in 1937 undoubtedly reflects the free distribution of phosphatic fertilizers to farmers by government agencies. A new factor is the successful production and shipment on a large scale of elemental phosphorus, foreshadowing, perhaps, first, freight savings that may speed up the exploitation of huge deposits in the western states, and, second, the increased utilization of low grade phosphate rock deposits, reserves of which would probably markedly increase present conservative estimates of mineable phosphate rock reserves of the United States which already exceed 7,000,000 tons.

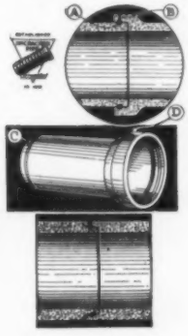
Mined production, shipments (both quantity and value), imports (both quantity and value), domestic consumption, and stocks were greater in 1937 than in 1936. Exports, however, both in quantity and value, were less in 1937 than in 1936. Total shipments in 1937 were 18 per cent. above 1936 in quantity, but only 13.6 per cent. greater in value, the average value per ton dropping from $3.40 in 1936 to $3.28 in 1937.

5 Reasons Why You Should Choose The Dual Packer Head Machine for Better Concrete Pipe Production

1. The Dual Packer Head offers the greatest economy in producing 4 to 36 inch pipe.
2. It enables you to operate on either full or partial production basis with smaller crews.
3. It eliminates pallets, allowing immediate stripping of molds.
4. It permits you to lease a portable unit to take care of those distant jobs at a profit.
5. Finally, it produces a superior pipe, highly resistant to abrasion and corrosion, and provided with New Sealtite Joint preventing leaks and excessive infiltration—a pipe Guaranteed to stand up.

Write for details.

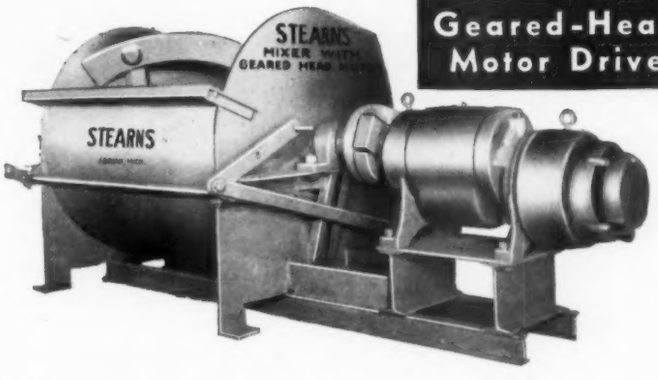




CONCRETE PIPE MACHINERY CO.
SIOUX CITY, IOWA

Turns Aggregates into Profits

NEW Geared-Head Motor Drive



THIS new Stearns Mixer is especially adapted for central mixing plants. It produces specification concrete of desired workability, at low operating and maintenance cost. Geared-head motor drive cuts power consumption. Reduction gears run in oil. Also offered in conventional clutch pulley or direct V-belt drive. "Sterloy" ribbon blades and replaceable bar type liners of abrasive resisting steel assure long life. Large discharge door locks open and shut without latches or catches, controlled from operator's side. Built in 28 ft., 42 ft. and smaller sizes. Write for specifications.

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GENE OLSEN, PRESIDENT

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Here's A Profitable Line For You

Make Sand-Lime, Cinder & Cement Blocks and Bricks and cash in on big demand for these economical building units. Over 300 blocks an hour can be made with this new JACKSON & CHURCH block press. They can be handled directly from the press without use of pallets or racks, at a saving in installation and operation.

Latest model brick presses have a capacity of over 3300 bricks per hour. All machinery is sturdily built and easily maintained.

A complete line of machinery to manufacture Sand-Lime Brick and Block using the Saginaw System over thirty years.

Our engineers will help you plan your complete plant.

Write for complete details now

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SAGINAW, MICHIGAN

BARRETT LIFT-TRUCKS
ONE MAN HANDLES 48 BLOCKS
NO BREAKAGE

Available for fifteen days free trial without obligating you to buy.

Handle your green concrete products the way that more than 800 other concrete products plants do. WITH BARRETT LIFT-TRUCKS EQUIPPED WITH A SUPER-SPRING FRAME AND RUBBER TIRES. Eliminate breakage—joggling out of shape and spoilage. Save time, money and labor by eliminating all unnecessary handling and breakage. Take your blocks direct from the machine to the curing room—with ease and dispatch. One man handles 48 blocks of the 8x8x16 size—or, 32 blocks of the 8x12x16 size. Write for illustrated circular.

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Whenever or wherever storage, batching or bulk cement plants are needed Heltzel-built equipment has always been the leader in point of service, ease of installation, economy of operation and length of service. Portable bins, built to suit the requirements of the concern whose base of operations change from place to place, are the only PORTABLE bins on the market.

300 TON
FIVE COMPARTMENT
AGGREGATE BIN WITH 1200
BBL. RESERVE BULK CEMENT PLANT
FED BY GRAVITY TO AN ELEVATOR FOR
A 50 BBL. BATCHING UNIT AND A FIVE
YARD TRUCK MIXER BATCHER . . . .
ONE MAN OPERATION

Standard Circular, Square and Oblong bins, ranging in capacity from 35 to 500 tons, available in one, two, three and four compartments, featuring convertibility from one to two or three or four compartments without making alterations or changes in weighing or batcher equipment, make specially built or designed equipment almost unnecessary.

Bulletins S-18-B and S-21-B, describing in detail these plants and their varied applications, are ready. Write today for your copies.

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BUILDS IT BETTER

- BINS, Portable and Stationary
- CEMENT BINS, Portable and Stationary
- CENTRAL MIXING PLANTS
- BATCHERS (for batch trucks or truck mixers with automatic dial or beam scale)
- BITUMINOUS PAVING FORMS
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- FINISHING TOOLS FOR CONCRETE ROADS

HELTZEL STEEL FORM & IRON CO.
WARREN, OHIO, U.S.A.

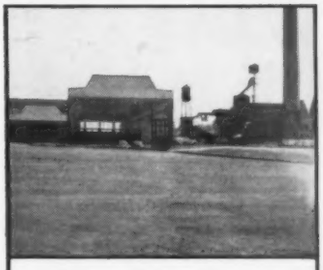
THESE MARKETS FOR STABILIZED MIXTURES ARE READY MADE FOR AGGREGATE PRODUCERS

Rural Roads in many states are now being improved by addition of a substantial dustless wearing course of aggregates, binder soil and calcium chloride delivered to the job by aggregate producers and contractors.

Pre-stabilized materials can be delivered, applied and compacted with the least interference with residents and traffic. Residents want dustless streets. City officials want to supply them. Producers of plant-mix aggregates are the natural source of supply.

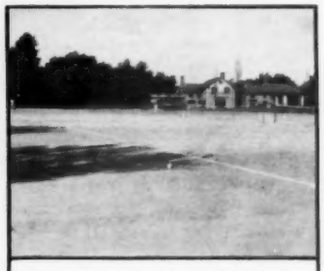
Private estate driveways are also a natural for plant-mix materials. Architects prefer artistic gravel or stone drives. Pavements are both costly and inartistic. Stabilized drives are adequate for traffic, dustless, artistic and fit the landscape.

Pavement shoulders are most satisfactorily taken care of by use of stabilized soil mixtures which hold up to the edge of the pavement, compact firmly under traffic, provide safe emergency turn-outs and tire change foundations.

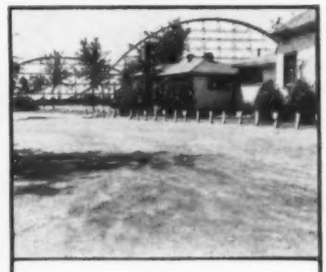


Parking lots in cities offer wide sales opportunity to provide plant-mix materials to produce dustless, compact parking surfaces at lowest cost.

Cemetery and park drives should always be firm and dustless. Stabilized soils provide the best type of low-cost driveway for the traffic volume encountered.



Tennis courts and playgrounds can be built of stabilized sand clay mix to provide firm, dustless play surfaces with less sun glare.



Amusement parks have taken kindly to stabilized soil walks and drives. Dust hurts their business. Stabilized soil and calcium chloride mixtures stay dustless without any offensive odor.

CALCIUM CHLORIDE ASSOCIATION, 4145 PENOBSCOT BLDG., DETROIT, MICHIGAN

Are you prepared to mix and deliver these ready-mixed materials? Write today for booklet telling how they are produced.

CALCIUM CHLORIDE ASSOCIATION
4145 Penobscot Bldg., Detroit, Mich.

Please send me booklet describing Stabilized Mixture.

Name .....

Address .....

CALCIUM CHLORIDE
FOR STABILIZING ROAD SURFACES

PROFITABLE

BIG OPPORTUNITIES

MANUFACTURING MATERIALS FOR LOW COST BUILDING

OPPORTUNITY COMPLETE, READY-MADE FOR YOU IN YOUR LOCALITY—One that is proven—ready for you to cash in on the great building upturn under way. It includes the essentials upon which sound and successful business enterprises are established.

SUPERIOR PRODUCT, LOW COST PRODUCTION—You will produce a material nearly 20% lighter in weight—A product capable of meeting all known building requirements—One accepted by Government and City Building Departments—Requiring 20% less material—Made by line production machines.

EARNING POWER AND FUTURE—Present DUNBRIK-DUNSTONE Manufacturers already point the way for you. Some are selling output at 100% over cost. Others are getting as high as 80% of the brick business.

WE EQUIP YOU WITH LINE PRODUCTION MACHINERY—Large production—only one or two men. Equipment costs but fraction of other processes of equal capacity. Franchise granted covering your locality—protecting your market, business and future.

INVESTIGATE NOW—Send for "4 Keys to Success." It tells the complete story — How present manufacturers are making outstanding progress in this new industry — One that offers unlimited opportunity for growth, expansion and profit. Write today.

BETTER MATERIAL AT LOWER COST

Countless numbers of new homes, apartments and structures for business and industrial purposes are needed today. Government, industry, business, financial institutions and municipalities — all are combining to speed up this needed construction. They actually are paving the way and assuring a market for the man equipped to supply the enormous demand in his territory for building materials.

Your product will be permanent, fire and termite proof—in a full range of beautiful colors, shades and textures. Improved design cuts construction costs to the level of frame—and with factory-to-job delivery, offers new standard of service to building trade in your community.

W. E. DUNN MFG. CO. 420 W. 24TH ST., HOLLAND, MICHIGAN

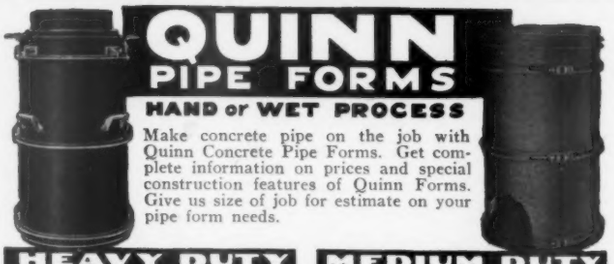
The MULTIPLEX Hand-Operated Double Stripper.... *Makes TWO Blocks While Others Make ONE*

Investigate this high production, low-cost machine before you purchase any equipment for the manufacture of concrete building units. The Multiplex Double Stripper requires no motive power, yet will produce from 500 to 1,000 quality units per day. Produces waterproof block from a wet mix. Masons prefer blocks made on Multiplex machines because every side is finished and true to size. Adjustable for all sizes of random ashlar work as well as other sizes and style units, and changes are quickly made.

Thousands of plants, even those with outputs of 100,000 annually, have built up a reputation and a sound business with Multiplex Hand Strippers. Investigate this machine today!

MULTIPLEX CONCRETE MACHINERY CO.

ELMORE, OHIO



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HAND or WET PROCESS

Make concrete pipe on the job with Quinn Concrete Pipe Forms. Get complete information on prices and special construction features of Quinn Forms. Give us size of job for estimate on your pipe form needs.

HEAVY DUTY

Built for more years of service—sizes for any diameter pipe from 12 to 84 inches — any length — tongue and groove or bell end.

MEDIUM DUTY

Makes same sizes pipe as "Heavy Duty" but built to meet demand for lower cost equipment to produce uniform quality in smaller amounts.

Also manufacturers of concrete pipe machines for making pipe by machine process.

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Samuel S. Friedman, Manager

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CONVENIENT

Located near the shops, theatres and main offices—with its own garage.

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Excellent food and mixed drinks served in the air-conditioned Kentucky Tavern and Bar.

RATES

Single from . . $3.00 — Double from . . $5.00
Air-Conditioned Slightly Higher

The Kentucky HOTEL

Fifth & Walnut Sts. Louisville, Kentucky

Compare the Details... then buy

Blaw-Knox TRUKMIXERS

WATER DISTRIBUTION
Superior, non-clogging water bells, accessible for easy cleaning and maintenance.

ONE-MAN CHUTES
A real one-man chute. Best for ease of handling and meets all practical operating conditions.

SAFE GAS TANK
Accessible for filling, located on cat walk, same side as tank for truck engine; reduces fire hazard.

EASY CLEANING
Simple to keep clean. Interior of drum designed to prevent building up with concrete. Ordinary care will keep drum and blades clean.

ROLLER BEARINGS
Oversize and positively sealed against concrete and grit. No maintenance required for bearings that support the truck mixer and its load.

CONVENIENT CONTROLS
Easy and rapid operation, lore and all. Fitted with ball bearings at pivot points to hold adjustment.

TIGHT DOORS
Machined steel doors and steel door seats which remain true and will not leak. No wrench required for operating charging door on 1½ and 2 cubic yard Trukmixers.

EFFICIENT MIXING BLADES
Deeper blades of unique design for faster and more efficient mixing action. Drum takes load better and quicker.

ACCURATE WATER MEASUREMENT
Improved for greater accuracy of water measurement under all operating conditions. Not affected by splash or side hill condition during transit.

Completely described in the New Blaw-Knox catalog No. 1582.

SEND FOR IT →

★ Added to the above advantages are the excellence of design and materials in Blaw-Knox Trukmixers and Agitators, such as—manganese alloy steel in drum and blades; hardened and heat treated steel castings at points of wear; oversize parts where strains are concentrated—all based on studies made under variable job operating conditions.

These important features of Blaw-Knox Trukmixers and Agitators mean efficient operation, continuous and dependable service, freedom from breakdowns and delays and greater durability of equipment.

You get all of these advantages at no extra cost when you buy Blaw-Knox Trukmixers and Agitators.

BLAW-KNOX DIVISION of Blaw-Knox Company, 208 Farmers Bank Building, Pittsburgh, Penna.

BLAW-KNOX

TRUKMIXERS—1; 1½; 2½; 3½ and 4 cubic yard capacity • AGITATORS—1½; 2; 3; 4½ and 6 cubic yard capacity

PROFITABLE NEW PRODUCTS

Read the Answers

Why Other Dealers Are Going Into "Ready Mixed":

- Because the ready-mixed concrete business grew right thru the depression and has one of the brightest futures in America today.
- Because there is a better profit in selling ready-mixed concrete than in selling bulk sand, stone and cement.
- Because it keeps your men, trucks and equipment working profitably the year 'round.
- Because it improves your service, brings you new customers, increases your volume on allied lines.
- Because anyone who owns trucks needs but a small additional investment in loading plant and mixers — and it is very easy to expand facilities as needed.

Why Most Successful Plants Buy Jaeger Truck Mixers:

- Because Jaeger Truck Mixers produce a higher strength, more workable concrete, proven by impartial, recorded tests.
- Because so many engineers and contractors recognize this higher quality and prefer to buy from Jaeger operators.
- Because Jaeger 2-speed mixing and faster charging and discharging mean faster trips, more payloads, bigger earnings per unit.
- Because Man-Ten alloy steel, 3-point mounting, low center of gravity and correct load distribution make Jaeger maintenance amazingly low.
- Because Jaeger operators reorder as they grow — some as often as 10 to 18 times.

30,000,000 CUBIC YARDS OF JAEGER CONCRETE TELL THE STORY — Write today for Specification TM-37, describing Jaeger Truck Mixers and plant methods which have sold far more ready-mixed concrete than any other equipment on the market.
THE JAEGER MACHINE COMPANY, 602 Dublin Avenue, Columbus, Ohio.

JAEGER 1, 1½, 2-2½, 3, 4, 5, 6 CUBIC YARD SIZES **TRUCK MIXERS**

J. Rutledge Hill
Vice-President
Gifford-Hill & Co., Inc.
Dallas, Tex.

MEN · OF · THE · INDUSTRY

Mr. Hill, the new president of the National Sand & Gravel Assn., has been vice-president of Gifford-Hill & Co., Inc., Dallas, Tex., since 1926. His company, one of the leading aggregates producers in this country, operates a dozen plants in Texas. Born at Wills Point, Tex., on March 3, 1892, he was graduated from Texas A. & M. College in 1913 and practiced highway engineering in the Lone Star state from shortly after his graduation until 1921, with the exception of the period of the World War when he served in the army air service. From 1921 until 1926 he was a member of the construction firm of Hill, Wilson & Watson. He has long been active in the affairs of the N. S. & G. Assn. as well as his own state organization. He also served as a director and committee member of the Associated General Contractors for a number of years.

FULL WELDING ECONOMY IS *Sure*

. . . when you repair or build-up wearing parts with

TISCO TIMANG*

AIR-TOUGHENING NICKEL MANGANESE STEEL WELDING ROD

Be *sure* TIMANG Welding Rod is used for your winter repairs . . . or for any manganese or carbon steel part that is built-up or welded. Thus you *assure* tough, strong welds with maximum resistance to wear. The reasons are obvious:

When you weld with TIMANG you get the correct amount of manganese *into* the weld. Thus each TIMANG weld possesses the strength, toughness and wear-resistance of manganese steel. And TIMANG flows freely, doesn't bubble, and requires no water quenching.

TIMANG is the original air-toughening manganese steel welding rod . . . developed in the TISCO laboratories . . . and now used as standard by mines and quarries because of its economy and long, satisfactory wear. Be sure to get full data on TIMANG, as well as on TISCO APPLICATOR BARS and TISCO HARD SURFACING ELECTRODES. Write today.

*"TIMANG" (a registered trade mark) Steel is patented in U. S. A. and foreign countries.

When they're worn out, be sure each wearing part is replaced with one made of genuine TISCO manganese steel. But if it's possible to repair, use TISCO TIMANG for all parts including:

DIPPER TEETH
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Personal Mention

JOHN T. WASHBURN and ABE UPP are operating a new concrete-pipe plant at Woodlake, Cal., known as the Woodlake Concrete Products Co. Mr. Washburn was formerly in the pipe business and Mr. Upp is a building contractor at Woodlake.

WILLIAM H. EVERS is head of the new firm of Concrete Products, Inc., which is building a new plant for the production of precast concrete units at Marion, O., scheduled to begin operating in May. Mr. Evers was engaged in the production of concrete products in Cleveland from 1923 until 1933. The firm will specialize in the manufacture of precast concrete cribbing.

WM. J. KUNTZ, president of the Lime & Hydrate Plants Co., York, Pa., will leave immediately after the annual convention of the National Lime Assn. for Honolulu where he will supervise the installation of Kuntz hydrating and burning equipment at the Hawaiian Gas Products plant.

ARTHUR W. REIDINGER, formerly with the McGraw-Hill Publishing Co., New York, N. Y., has become advertising and assistant sales manager of Bay City Shovels, Inc.

DR. FRED C. HAMILTON of Kankakee, Ill., has purchased the pit formerly operated near Chebanse, Ill., by the Kankakee Sand Co.

C. B. DUTTON, long identified with the concrete industry, has been made sales manager of the R & L Concrete Machinery Co., Kendallville, Ind.

GEORGE H. BUCHER, executive vice-president of the Westinghouse Electric & Mfg. Co., has been elected president. FRANK A. MERRICK, president since 1929, was elected vice chairman of the board of directors.

W. S. OTTO has been appointed district sales engineer for the St. Louis territory by Sprout, Waldron & Co., Muncy, Pa.

GEORGE T. MAHANEY and JAMES D. PLATT have been named eastern and western retail-sales managers, respectively, of the Diesel-engine division, General Motors Sales Corp. Both will maintain offices at the headquarters of the new Diesel division in Cleveland.

H. S. STROUSE has been appointed vice-president of the Harnischfeger Corp., Milwaukee, Wis. Along with the duties of his new position, Mr. Strouse will continue to direct the activities of the treasurer's department which he has headed for the past seven years.

ALBERT VON UNWERTH has established a ready-mixed-concrete service at Vinita, Okla., the only one in that area.

R. K. MANGAN has been appointed vice-president of the Buda Co. in charge of advertising, domestic and export sales of Diesel and gasoline engines. He has been associated with the Buda Co. in an engineering and sales capacity for approximately twenty years.

MORGAN L. WOODRUFF, 1812 Colfax St., Evanston, Ill., has been appointed district sales engineer for the Chicago area by Sprout, Waldron & Co.

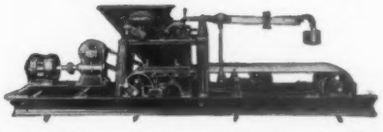
THOMAS GESLIN is reported to have started production of sand and gravel at Logan, O., under the firm name of the Logan Sand & Gravel Co.

CHARLES D. WRIGHT, who retired in 1927 as general sales manager of the Missouri Portland Cement Co., died recently at his home in Kansas City, Mo. He was 73 years old and was a native of Pennsylvania.

GEORGE N. DAWES, 59, former sales manager of the Alpha Portland Cement Co., died April 6 in Miami Beach, Fla. His home was at Ventnor, N. J.

WINTHROP C. NEILSON, 60, an authority on bauxite, and president of the Republic Mining & Manufacturing Co., a subsidiary of the Aluminum Company of America, died March 12 at his home in Ardmore, Pa. He also was a vice president of the Aluminum Company of America.

MATERIAL weighed and proportioned with 99% Accuracy



Weighing and proportioning material with 99% accuracy, Schaffer Poidometers are recognized throughout the cement industry as important equipment in modern plant control.

Schaffer Poidometers are automatic in action and will operate continuously or, with a mechanical weighmaster attachment, will provide batch operation.

This efficient weighing equipment is now saving thousands of dollars throughout the cement industry. Many leading plants are now saving money while obtaining greater efficiency with Schaffer Poidometers. Let us help solve your proportioning and feeding problems. *Write for catalog No. 5.*

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PERFORATED METAL SCREENS
FOR SAND, GRAVEL STONE, ETC.

Manufactured exactly to your specifications.

Any size or style screen, in thickness of steel wanted with any size perforation desired.

We can promptly duplicate your present screens at lowest prices.

Prompt Shipment

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Foreign Developments

Beduin "Cement" Is Burned in Ground

"Djes" is a Beduin "cement" prepared and used in the Syrian desert by the sedentary or semi-nomadic tribes for masonry mortar and for interior and exterior plastering and stuccoing. It is constituted almost exclusively of sulphate of lime, thus being in the class of the plasters, but has certain individual properties due probably to numerous foreign elements in its composition (the authors have collected specimens for a laboratory study). The "cement" is prepared in a picturesque fashion: an Arab "specialist" selects a suitable location, has a suitable area of the ground swept clean, then piles on it a layer of camel dung or straw 7 to 10 cm. thick, which is burned for about one night. Then the ashes are swept away and the calcined material gathered by shovels. The material in the ground is, of course, a kind of gypsum. The material is used even for exterior stucco or plaster, being patched in successive years until a permanent finish is attained.—H. Fillion and P. Kopp in *Revue des Materiaux de Construction et de Travaux Publics*, No. 339, December, 1937, pp. 258-259.

Burning Characteristics of Manganese Materials

When operating with manganese-bearing raw materials, the color of the clinker powder changes, if burned under reducing conditions, from dark gray to a typical chocolate brown. This change of color, however, is not an absolute criterion of reducing burning, since at higher burning temperatures brown shades also occur on account of the dissociation of the higher manganese oxides. The surest sign of reducing burning conditions, when working with manganese and sulphur-bearing raw materials, is, accordingly, the presence of sulphide sulphur in the clinker.

Clinkers burned under reducing conditions have a much lower initial strength than clinkers burned under oxidizing conditions. The reason for this is not the slight change in the chemical conditions brought about by the reduction, but the different speed of hydration, which depends not only on the chemical and mineralogical composition but also to a great extent on the clinker structure (contact surface).—G. Mussgnug in *Zement* 26:809-812, December 16, 1937.

Liter-Weight Method of Clinker Test

Studies previously published by the authors concerning the "liter-weight" method of determining the quality of clinker (*Zement* 25, p. 633, 1936; *Zement* 26, p. 502 ff., 1937) have been criticized by writers in various subsequent works, and the objections are principally as follows:

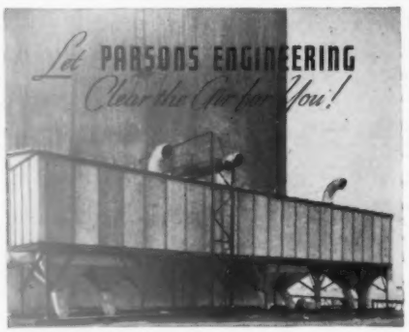
1. The sieve fractions of the clinker are noticeably different in liter-weight and also different in their content of free lime, the determining indication of insufficiently burned clinker. The selection of the fraction taken for the liter-weight determination is therefor subject to chance, and scarcely gives a uniform conclusion as to the degree of burning (Haegermann).

2. The variations in the chemical composition and physical accidents during the burning process result in variations of the liter-weight, which depends on the degree of burning, and consequently leads to wrong evaluation of the degree of burning (Mussgnug).

3. The "volume weight," introducing the concept of the "true" or "corrected" liter-weight, ought to be taken in preference to the liter-weight, on account of the entirely fortuitous external volume of pores. Thus only the pores occurring inside the individual clinker particles should be considered in the weight differences to be evaluated (Mussgnug and Würzner).

4. These volumetric weights are not entirely dependent on the degree of burning; the clinker can, for instance, swell with sharp burning (Würzner).

After a consideration of these objections, the authors conclude that there has not yet been raised any serious objection to the liter weight as a method of judging quality of clinker.—Wilhelm Anselm and Dr.—Ing. Karl Schindler in *Zement* 27:137—140, March 10, 1938.



A 15-year record of repeat business would imply that sound Parsons engineering is worthy of *your* investigation, too. Parsons' patented oval bag principle, long life, low dust count and minimum maintenance enable Parsons Dust Arrestors to excel in the cement industry. Write for our Bulletin DA-6.

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• Pulverizers •
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Occupational Diseases and the Law

Safe Place to Work

Rzeszotarski v. American Smelting & Refining Co., Nebraska Supreme Court, decided January 21, 1938. In this suit a former employee sought to recover damages from the employer on account of lead poisoning, basing his action on Sec. 48-403 of the Factory Act and on the employer's alleged failure to furnish a safe place to work or with proper equipment for such work. Sec. 48-403 requires in specified places, where dust or fumes may be inhaled by persons employed, the provision of "a fan or other such mechanical device as will substantially carry away all such dust or fumes or other impurities, subject to the approval of the Department of Labor". The court holds that the words "substantially carry away all such dust or fumes or other impurities" mean to carry away such dust, fumes or other impurities to a high degree; that where an employer provides his foundry with ample ventilation and equips a cupola furnace with a fan so that the amount of dust or fumes, if any, is negligible, and the foundry is inspected twice a year by a representative of the Department of Labor, who made no additional requirement, the employer had complied with Sec. 48-403. The rule for Nebraska is properly stated in *Grant Storage Battery Co. v. De Lay*, 87 Fed. (2d) 726: "Where appliance furnished employee to protect him from lead dust and fumes was of standard make and in common use, and had adequately protected employees for many years, and there was no substantial evidence that there was any defect therein, or that any better type was known, issue of negligence in not furnishing proper appliance should not have been submitted to the jury".

The court also follows the case of *Ahrens v. American Smelting & Refining Co.*, 132 Neb. 460, 272 N.W. 235, notwithstanding the fact that that case did not involve the Factory Act, as acceptable to the duties and obligation of an employer in providing for the care and safety of its employees. In the Ahrens case the rule is stated as follows: "A servant accepting the employment of the master assumes all ordinary risks and dangers incident to his employment, or the conditions under which his work is performed, which are known to him or, in the exercise of ordinary care, would be apparent and obvious to persons of his experience, intelligence or understanding. When a master who operates a smelting and refining plant equips such a plant with approved safety appliances and orders a servant to wear a respirator furnished him by the master, instructs him generally as to the danger of contracting the occupational disease known as plumbism, informs him of the manner in which such disease may be contracted, the nature and consequence thereof, the master will not be held liable to damages to such servant who contracts such disease while in the employ of the master."

Common-Law Action

Murphy v. American Enka Corp. et al., decided by the North Carolina Supreme Court, March 2, 1938. Both the employer and the employee involved in this suit had accepted the provisions of the North Carolina Workmen's Compensation Act, and a claim for compensation for disablement had been denied by the Industrial Commission and the courts. The workmen then filed an action at common law for damages.

The North Carolina Workmen's Compensation Act was extended by Chap. 123, Public Laws of 1935, to treat occupational diseases therein described as the happening of an injury by accident within the meaning of the Act. Although the injury of which the workman complains (abscessed kidney from inhalation of fumes in the company's paint department) is not among the occupational diseases listed as compensable, the Court holds that the workman is not entitled to maintain a suit at common law based on the employer's negligence. The facts and the rule are similar to *Lee v. American Enka Corp.*, 193 S.E. 809. Where the employee fails to reject the provisions of the Compensation Act, he surrenders his right to sue for damages for an injury caused by the negligence of the employer.

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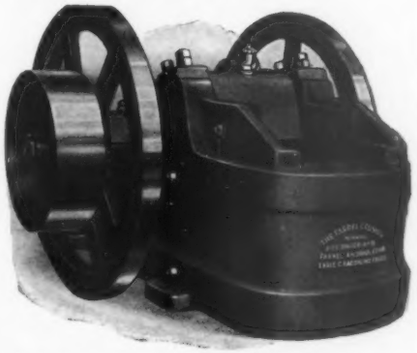
Complete Plants Designed and Equipped. Screens, Elevators, Conveyors, Quarry, Sand and Gravel Plant Equipment. Engineering Service.



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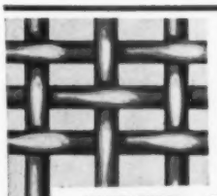

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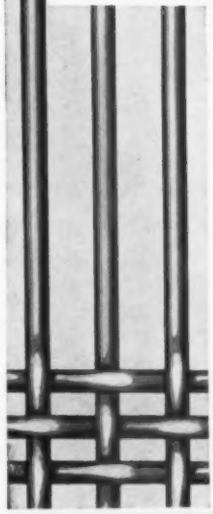

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HUM-MER and TYPE 400 SCREENS

SCRUBBING and DRYING MACHINERY

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Cleveland, Ohio

Traffic News Digest

Legislation

Train Limit Bill—Hearings on Senate bill 69 which passed the Senate at the last session of Congress and which would limit the length of trains to 70 cars were held before the House Committee on Interstate Commerce and Foreign Commerce. Appearing in favor of the proposed legislation were the various railroad brotherhoods while the railroads and shippers appeared in opposition. On March 31st the house committee took up consideration of the bill and by a vote of 14 to 7 declined to report it out of committee. An agreement was made in the committee that no member would divulge anything with respect of the action on the bill and the names of the members who voted will not be made public. Chairman Lea in commenting on the action said he did not think the bill would be passed since it could not be taken out of committee except on a petition signed by 218 members.

Fourth-Section Revision—Hearings on the Pettengill Bill which passed the House at the last session of Congress and which would repeal the long and short haul clause of the 4th section of the Interstate Commerce Act were begun before the Senate Committee on Interstate and Foreign Commerce on Feb. 24th. No new arguments in favor of the bill were presented by any of its proponents although it was brought out that freight tariffs would be greatly simplified by doing away with the routing restrictions which are now necessary to comply with the regulations of the Commission on this part of the fourth section. When the hearing was resumed on March 11th to hear opponents of the bill a request was made for 120 hours for presentation of opposition testimony. While this legislation was proposed by the National Industrial Traffic League it was brought out at the hearing that at no time had a majority of the members of the league voted to support of the Pettingill Bill. Vigorous opposition was voiced by steamship lines operating on the east coast, by shipping interests using the Great Lakes and by the Inland Waterways Corp. Commissioner Eastman of the Interstate Commerce Commission testified that 9 members of the Commission including himself were opposed to any change in the fourth section. Others opposing this legislation were shippers from western states and the west coast and trucking interests from various parts of the country. At the conclusion of the hearing Chairman Wheeler of the Senate Interstate Commerce Committee expressed the opinion that the bill would not pass the Senate. It will first have to be considered by the Committee in executive session and if the Committee approves the bill it will then go into the floor of the Senate where it is expected that opponents will delay action as much as they can hoping that Congress will adjourn before any definite action is taken.

Recent I. C. C. Decisions

Crushed Stone—The Commission has authorized the Columbia, Newberry and Laurens Railroad to establish a rate of 30c. a net ton on crushed stone and on mixtures of crushed stone, screenings and sand from Columbia, S. C., to Irmo and Wesco Siding, S. C. Prior orders have been notified to permit applicants to establish this rate to expire on June 30th on account of a road widening project by the South Carolina Highway Commission. The present rate is 55c. per ton. I. C. C. Docket No. 22, 109 Rates on Sand, Gravel, Crushed Stone, etc., within the state of South Carolina.

Sand—On finding the rate on core sand from Davisville, R. I., to Coxsockie, N. Y., between Feb. 17th, 1932 and June 5th, 1935 unreasonable to the extent it exceeded $3.05 a net ton the Commission has awarded reparation amounting to $137.28 with interest in I. C. C. Docket No. 27,761 American Valve Co. *v.* New Haven, *et al.*

An award of reparation has been made on finding that the rate charged on moulding sand from Dorchester, N. J., to Syracuse, N. Y., were unreasonable to the extent that it exceeded $2.80 a net ton and that the rates from Allegheny, N. Y., to Huntingdon, Pa., were unreasonable to the extent they exceeded $2.20 a net ton plus 11c emergency charge. I. C. C. Docket No. 27,605 Pierce Butler Radiator Corp. *v.* D. & H.

Examiners' Reports

Amesite—Examiner Harold M. Brown recommends that the Commission find the rates charged on a carload of asphalt-coated stone from St. Louis, Mo., to Effingham, Ill., in May 1936, unreasonable to the extent it exceeded the charge that would have accrued at the applicable rate of $1.53 a net ton on a minimum of 72,000 lb. The carrier charged the rate of $1.53 on a minimum of 126,000 lb. The shipment weighed 60,200 lb. An award of reparation of $44.20 with interest was also recommended. I. C. C. Docket No. 27,816 Granite Bituminous Paving Co. *v.* Pennsylvania, *et al.*

Sand—In the case involving shipment of sand from Hawarden, Ia., to Baltic, Mitchell and Flandreau, S. D., during 1932 and 1935 Examiner Alfred G. Hagerty proposes that the rates charged be found unreasonable to the extent they exceeded 60c. a net ton to Baltic and 80c. to Mitchell and Flandreau plus an emergency charge of 6c. on the shipments to Baltic and Mitchell. The applicable rates charged were 80c, $1.18 and $1.03 respectively without the emergency charges. Shipments were made before the effective date of reduced rates which the carrier decided to publish so that this shipper could obtain the business in competition with sand from nearer producers. I. C. C. Docket No. 27,831 Western Asphalt Paving Corp. *v.* Milwaukee, *et al.*

New Complaints Filed

Sand—A violation of section 1 is alleged and reparation is sought in a complaint involving the rates and charges on sand from Cedar Lake, N. J., to Muncy, Pa., during March and May 1935, filed by Abner Pollack, 1148 Manor Ave., New York, N. Y., in I. C. C. Docket No. 27,988 Sprout Waldron & Co., Muncy, Pa., *v.* Central of New Jersey, *et al.*

In another complaint filed by Mr. Pollack the rates on sand from Bruckarts, Pa., to Cohoes, N. Y., are attacked under section 1

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with a request for reparation. I. C. C. Docket No. 27,992 Cohoes Rolling Mill Co., Cohoes, N. Y., *v.* Delaware & Hudson, *et al.*

Reparation is sought on an alleged violation of section 1 in connection with the rate on sand from LaGrange, Mo., to Montrose, Ia., in a complaint filed by H. C. Phillips, State Central Savings Bank Bldg., Keokuk, Ia., in I. C. C. Docket No. 27,005 Cameron Joyce & Co., Keokuk, Ia., *v.* Burlington.

Whiting—Alleging unreasonable rates and charges on whiting from Camden, N. J., to Buffalo and Black Rock, N. Y., an award of reparation is sought in a complaint filed by Geo. F. Duffy, 491 Borse Bldg., Philadelphia, Pa., in I. C. C. Docket No. 27,921 sub No. 16 Rolls Chemical Co., Buffalo, N. Y., *v.* Pennsylvania-Reading Seashore Line, *et al.*

Motor-Truck Rates—A petition having been filed by motor truck carriers in central territory asking the Commission to institute a proceeding inquiring into the level of truck rates in central territory the Commission has opened an investigation into the maximum, minimum and precise basis of all rates, charges and classifications and the rules, regulations and practices relating thereto applicable to all transportation by all common carriers by motor vehicle between all points in Illinois, Indiana, Michigan, Ohio and Wisconsin and all points in Iowa, Kentucky, Missouri, New York, Pennsylvania and West Virginia. In the petition the motor carriers contend that the position of 90% of the truckers is being jeopardized by cut throat competition of the other 10. A tariff naming rates between the points has been published by an association of the carriers who are asking the Commission to freeze the rates at the levels named in this tariff. Should the Commission grant the petition of these carriers it is doubtful whether any further reduction of any rates could be made without a hearing before the Commission. I. C. C. Docket ExParte MC-21, Motor carrier rates in central territory.

A similar investigation instituted by the Commission on its own motion into the rates, charges and classifications, rules, regulations and practices of motor common carriers in the New England states and parts of New Jersey and New York have been instituted by the Commission in ExParte MC-22, Motor Carrier Rates in New England.

Traffic News

The President's Message—In the message sent to Congress on Apr. 11th the president recommended the enactment of immediate legislation to prevent serious financial difficulties for the railroads between now and the convening of the next Congress with a congressional study working toward a permanent solution of the railroad problem. Mr. Roosevelt made no recommendations as to just what legislation should be enacted but sent with his message a report prepared by Commissioners Splawn, Eastman and Mahaffie of the Interstate Commerce Commission. This report makes recommendations that approximately three hundred million dollars be made available from Government funds for the purchase of railroad equipment; that the RFC be empowered to make loans for 12 months without certification by the Interstate Commerce Commission that the railroad can meet its fixed charges; that other forms of Government credit be considered; that Government traffic pay full rates by eliminating land grant reductions; that the Commission does not feel justified in expressing an opinion for or against railroad wages and finally that reorganization proceedure under section 77 of the Bankruptcy Act receive the attention of Congress, and they suggest the establishment of a single court in charge or reorganization. In commenting on the report Chairman Jones of the RFC said in part:

"As for the 'long term program,' I have long been of the opinion that transportation should be treated as a national problem and a national responsibility, that the various methods of transportation, railroads, waterways, highways and airways, should be under one authority and that that authority should have power to fix rates, supervise service, require responsibility and designate, as far as practicable, movement of traffic by the facility best equipped to handle it. The authority should also have power to require consolidations.

"We should maintain effective competition, but cut-throat competition, either between railroads, or between any of the different methods of transportation, should not be allowed.

"Unnecessary duplication of service should be eliminated.

"I do not subscribe to the theory that our railroads are doomed. We must have the best possible facilities and service, but the roads should give ground to that part of our transportation which can best be handled by other methods.

"I suggest for your consideration that track labor and probably shop labor, now on WPA, could be allocated back to the roads that have had to displace this labor to avoid bankruptcy."

In a letter to President Roosevelt dated April 4th, J. J. Pelly, President of the Association of Railroads outlines a four-point plan of immediate action to relieve the present

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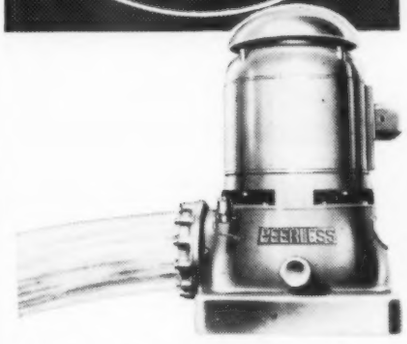

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railroad emergency. His first recommendation is that such steps as are available be taken to improve in general business conditions resutling in an increase in traffic. The second part of his program calls for an increase in railroad rates which would necessitate legislation to give the railroad more freedom to exercise their judgment to fix rates on traffic for which railway service is essential. He next suggests that railroad labor costs be reduced stating that it is not consistent or in the interest of reemployment to continue present wages which are at the highest level in history. The fourth point in his program calls for loans from the RFC to be made without approval of the Interstate Commerce Commission. A program for permanent relief includes an overhauling of the tax burdens on the railroads. He asks for an end to restrictive regulations which add to the expenses of operation without substantial benefit to the public interest. In this class are train limit bills, full crew bills, special limitation of hours of service not required for safety and similar measures now being strongly urged by groups. Section 15a should be re-written to require the Commission in fixing the rates to recognizing the right of the carriers to a fair return upon the value of property. He further asks that the consolidation be allowed to work out naturally without being forced and that the Interstate Commerce Commission be given greater power over state rights. Other points in his program called for elimination of land-grant rates, a limitation as to the claims of shippers for reparation; that the expense of all highway and railroad grade crossings elimination be assumed by Government and that the Government also assume costs for the construction of bridges over navigable water. The final request is for simplification of the proceedure under the railway labor act.

Commissioner Miller has suggested that the railroads be consolidated to a single system for ownership and operation under a private management. It is pointed out however that every time consolidation is mentioned that strenuous objection is raised to throwing men out of work through such consolidation.

Shortly after the President's message was received a canvass of the situation indicated that it was doubtful whether any emergency legislation could be enacted before Congress adjourned as a date of May 15 had been suggested for adjournment and it was doubtful whether it would be possible to prepare and enact railroad legislation of consequence before that date.

Trade Literature

The Cost of Aggregates Is the Cost of Handling. 4 p. Robins Conveying Belt Co., New York, N. Y.

Toe-Saver — the Finest Safety Boot Ever Built. Goodall Rubber Co., Philadelphia, Pa.

Dracco Equipment for All Industries. 4. p. Dracco Corp., Cleveland, O.

Diamond Vibrator Screens. 8. p. *Diamond Portable Quarry Plants.* 4 p. *Diamond Roll Crushers.* 12 p. Diamond Iron Works, Minneapolis, Minn.

Goulds Centrifugal Pumps. 8 p. Goulds Pumps, Inc., Seneca Falls, N. Y.

Koehring Excavators. 20 p. The Koehring Co., Milwaukee, Wis.

Expect Big Things from This Small Scraper. (folder) R. G. LeTourneau, Inc., Peoria, Ill.

U. S. Uniclosed Motor. 4 p. *Asbestos Protected U. S. Motors.* 4 p. U. S. Electrical Motors, Inc., Brooklyn, N. Y.

American Model 350 Gopher Shovel. 28 p. American Hoist & Derrick Co., St. Paul, Minn.

Join Pipe Without Threading. 16 p. S. R. Dresser Mfg. Co., Bradford, Pa.

Willson Products for Industrial Safety. 34 p. Willson Products, Inc., Reading, Pa.

Bucket Elevators. 56 p. Sprout, Waldron & Co., Inc., Muncy, Pa.

Notes Made on Factory Trips to Leading Rock Products Plants. 16 p. (Bulletin 2235. General Electric Co., Schenectady, N. Y.

Diesel Powered Electric Generators. 12 p. Caterpillar Tractor Co., Peoria, Ill.

Patterson Mixers. 8 p. Patterson Fdry. & Machine Co., East Liverpool, O.

Bay City Model 20-B. 12 p. *Bay City Model 62.* 8 p. Bay City Shovels, Inc., Bay City, Mich.

Eye Protection. 8 p. Mine Safety Appliances Co., Pittsburgh, Pa.

Transit . . . Pioneer of Truck Mixers. 20 p. Transit Mixers, Inc., New York, N. Y.

Leahy Heavy-Duty No-Blind Vibrating Screen. 20 p. Deister Concentrator Co., Ft. Wayne, Ind.

Brown Hygrometers. 28 p. Brown Instrument Co., Philadelphia, Pa.

Fairbanks-Morse Direct Current Motors. 8 p. Fairbanks-Morse & Co., Chicago, Ill.

ANW Cable. 8 p. Anaconda Wire & Cable Co., New York, N. Y.

Washing Equipment. 16 p. Allis-Chalmers Mfg. Co., Milwaukee, Wis.

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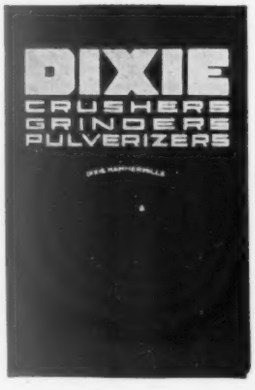

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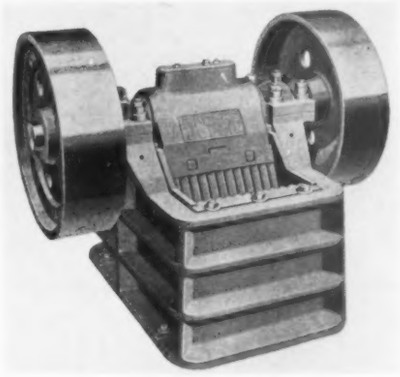
New Machinery and Supplies

• Jaw Crusher

The improved line of force-feed jaw crushers built by the Rogers Iron Wks. Co., Joplin, Mo., includes 14 sizes with jaw openings ranging from 5 in. by 6 in. to 15 in. by 36 in., power requirements varying from 5 to 80 hp. The smallest size will produce from 10 to 15 tons per day of ¾ to 1-in. stone while the largest has a capacity of 150 to 220 tons.

The crusher bed is a one-piece electric steel casting, ribbed and reinforced for strength and rigidity. The eccentric shaft is forged from



Force-feed jaw crusher.

chrome-nickel alloy steel. Side bearings are of bronze and adequately sealed against dirt.

The jaw bumper, cast of electric steel, is machined at points wherever accurate alignment is required. It is designed with a split at one side and fitted with bolts which clamp the sleeve bearing securely in place. A replaceable jaw rest is provided to take all wear from the end of the bumper which comes in contact with the jaw plate, at the same time protecting this lower end from undue wear of the discharging material.

The crusher jaws are of manganese or other special wear-resisting alloy steel, depending upon the type of material to be crushed. Jaws are reversible. All crushers are assembled complete and operated under actual plant conditions before shipment.

The Rogers Iron Wks. Co. also builds a line of portable crushing-and-screening plants, storage bins, revolving and vibrating screens and crushing rolls.

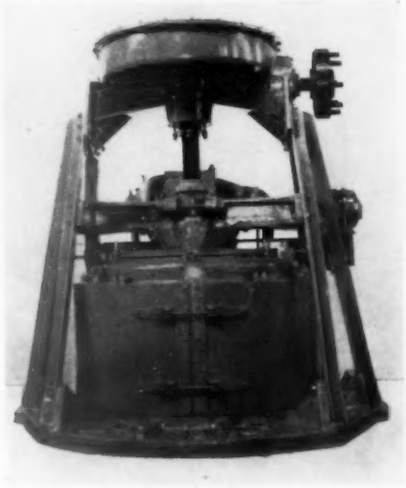
• Roll-Pulverizer

The Bradley Pulverizer Co., Allentown, Pa., has developed the Junior Hercules Mill which is similar in principle and construction to the Bradley Hercules Mill. This mill was formerly known as the Bradley 3-roll mill which had a vertical belt drive. In redesigning the mill, this drive was replaced with a bevel-gear drive mounted in the top cross bar of the mill.

The principle of this mill is well known to all users of pulverizing machinery, as it has proven to be efficient and practical for the reduction of such materials as agricultural limestone, phosphate rock, cement rock, asphalt filler and other refractory materials where a semi-fine product is required.

As it is now designed it is practically a duplicate of the Bradley Hercules Mill on a much smaller scale. It is a screen-type mill, taking material ¾ to 1 in. for feed and reducing to the necessary fineness in a single operation, the fineness of the finished product being regulated by the size of the screen used on the mill.

While this mill is capable of reducing material to a fineness of 70 to 75 per cent. through a 200-mesh sieve, it is most economical when operating to a fineness of 70 to 80 per cent.



Pulverizer for agricultural limestone and similar finely-ground material.

through 100 mesh, all the product passing 20 or 30 mesh. A coarser product can be obtained if desired.

For the agricultural-limestone plant, this mill takes stone ¾ to 1 in. and under, reducing to the desired fineness in a single operation. It produces a very well graded finished product that is most acceptable to the farmer, and it passes all requirements of the various agricultural experimental stations.

For the fertilizer plant grinding phosphate rock, such as Florida pebble, hard phosphate rock or Tennessee rock, it takes material ¾ to 1 in. and under, reducing to a fineness of 90 per cent. through a 60-mesh sieve in a single operation.

Like the Bradley Hercules mill it is so constructed that the material to be ground is distributed and delivered continuously onto the grinding ring, directly in front of the three advancing rolls and therefore is fed to the place where it is to be operated on, which accounts for the minimum amount of power used by this type of mill.

• Jumbo Cement Bag

A new means of batch hauling and dumping bulk cement for construction work is now provided by a cement bag offered by the Blaw-Knox Co., Pittsburgh, Pa. This bulk-cement container has a capacity of eight standard bags. It is made of heavy canvas, rubberized on both sides to form a weatherproof material, and reinforced as well as multiple-sewed at points of strain or wear. The reinforced hem at the closed end is constructed for bolting to

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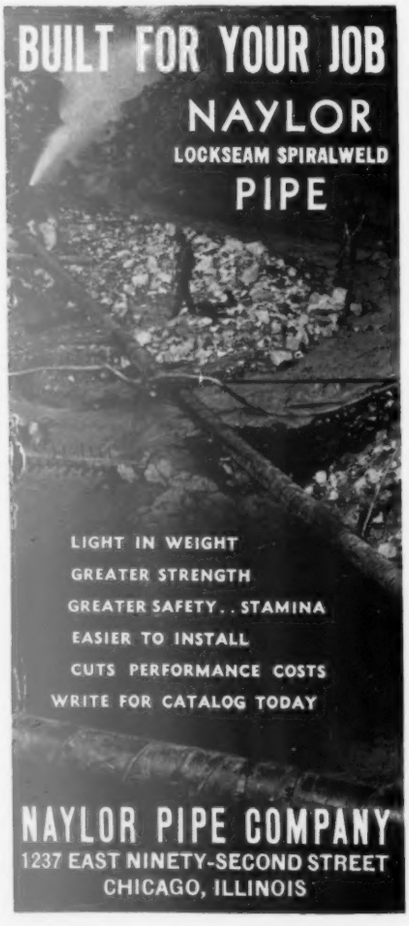
A view of the jumbo cement bag in the body of a truck.

the partition board of the hauling truck. The other end is open and equipped with flap covers. After loading, the end flaps are folded and the weight of the cement pressing against the aggregates seals the bag.

During transportation, the loaded bag lies on top of the sand and stone batch in the truck compartment, as shown in the illustration, and travels to the mixer in that position. Both loading and dumping are said to be made easy by the flap construction. When dumping batches into the paver skip, the flow of the aggregates releases the pressure on the folded flaps. The action of gravity then opens the cement bag automatically, and the cement flows into the skip together with the sand and stone.



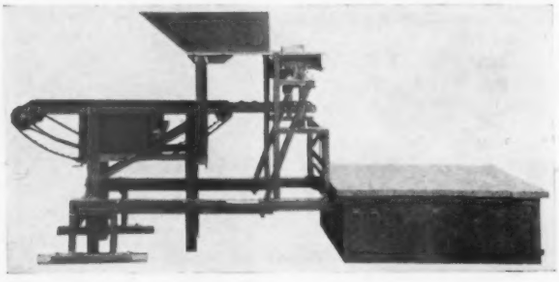
● Block Machine

A simple, economical machine for making concrete units, developed by M. L. White, head of the Hollostone Co., Hollywood, Cal., has attracted much attention recently. It employs vibration to compact the concrete. On two slightly flexible beams, horizontal in the same plane, supported at both ends, is mounted a controlled, adjustable vibrating mechanism. Also mounted on these beams is a frame supporting a rotatably-mounted mold. This mold may be fitted with cores and plates for any desired shape of unit and is fitted with a "loose" bottom. When in upright position, it is filled with concrete from a hopper on the same level as the top of the mold, vibrated by a touch of a switch, rotated 180 deg., when the bottom becomes the "stripper" to extrude the concrete downward. A device is provided to hold a wooden pallet on the mold as it is rotated and which serves also to lower the pallet in unison with the downwardly extruding concrete, this pallet carrying the formed tile coming to rest on a chain conveyor. This conveyor moves the tile gently away from the machine. The pallet may be picked up from the chain conveyor to load onto cars for steam-chamber curing, or rolled onto a shingle conveyor to the outdoor curing yard. The vibration gives a density that permits rolling onto the shingle conveyor for 300 ft. or more without damage to the concrete. Pallet and tile are stacked one on another as high as convenient, usually 7 high.

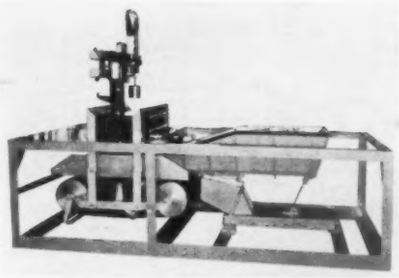
An interesting point is the small number of moving parts in the molding and extruding assembly. These consist of (1) the hand-rotated mold, (2) the pallet holder, (3) the lever lock that holds mold in position while filling and vibrating and (4) the movable bottom. The chain conveyor is on a separate frame free from vibration, driven by an electric motor through a speed reducer. The time of a complete cycle of operation filling the mold, vibrating, rotating, extruding and returning the mold to filling position, is 22 to 25 sec. Three 4 by 8 by 12-in. tile or their equivalent are made at each operation. Two men compose a full crew—mixer man delivering concrete to the machine hopper and rolling the tile to the curing yard, or one man can perform all the functions if necessary.

A mold is required for each size or kind of tile to be made. These molds can be changed by one man in approximately six minutes. Where production greater than the capacity of one machine is desired, they may be set up in batteries to any desired capacity, the molds being interchangeable.

A new full crawler-mounted, self-feeding bucket loader, Model 552, has been announced by Barber-Greene Co., Aurora, Ill. The bucket loader has many advantages contributing to its high speed and low cost operation. It operates continuously, giving a steady flow of material. Its spirals are self-feeding. Other features include a tank-type chassis frame, synchronized spiral feed and automatic overload release.



Vibration instead of tamping compacts the concrete in this machine.



Automatic feeder scale.

• Weighing Feeder

An automatic, continuous weigh feeder that provides a steady flow of bulk materials by weight per hour to a constant, close accuracy, has been made available by the Syntron Co., Homer City, Pa.

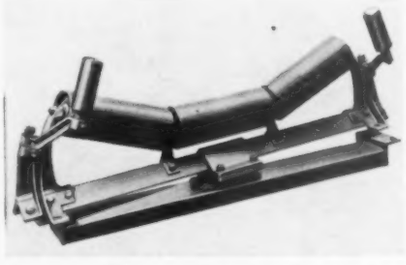
The machine is made up of a vibratory feeder-conveyor discharging onto a constant-speed belt-conveyor suspended from a scale having sensitive electric valves.

A constant load, by weight, is maintained at all times on the constant-speed belt-conveyor by the ability of the vibratory feeder to speed up or slow down its discharge as controlled by the electric valves which function on the slightest under-weight or over-weight movement of the scale beam.

The scale functions purely as a scale, exerting no mechanical power to operate its electric control valves. The vibratory feeder is of the pulsating, electric-magnet type conveying bulk material by vibration, so it flows like water.

The machine's uncanny ability automatically to maintain a constant load on a constant speed belt provides practically 100 per cent. accuracy of feed by weight.

New Continental Model CS-12A four-wheel wagon scraper on exhibit at the recent Road show. It is cable operated and employs pneumatic rear wheels mounted on through axles supported on both sides. Body and apron are of steel plate of ample proportions, heavily braced; cutting edge is full width and adjustable for any depth of cut. Weight has been minimized without sacrifice of strength or length of service life.



A new self-aligning idler for automatically training conveyor belts without damaging the belt announced by the Jeffrey Mfg. Co., Columbus, O. It consists of a standard anti-friction idler pivotally mounted on a supporting cross member, with guide rolls at each end. As there is no pressure between the guide rolls and belt, there can be no damage to the edge of the belt. The guide roll moves outwardly the instant the belt touches it, and in so doing swivels the idler sufficiently to cause the belt to return to normal position.

NEW CORPORATIONS

Muskogee Sand Co., Muskogee, Okla. Capital stock, $50,000. E. R. Jones, attorney, Equity Bldg., Muskogee.

Racine Washed Sand & Gravel Co., Mt. Pleasant, Wis. 400 shares at $25 each. Incorporators: H. D. C. Bannister, E. S. Cox and P. Dahlberg.

Plantmix Asphalt Industry of Kentucky, Louisville, Ky. A. A. Fischer, B. H. Collings and M. M. Best.

LaPorte Cement Products Co., LaPorte, Ind. 300 shares n.p.v. Incorporators: E. B. Watson, Lloyd and Sherman Cumerford.

Greater New York Sand & Gravel Corp., 200 shares n.p.v. Jacob I. Goodstein, 21 E. 40th St., New York, N. Y.

Brockmann Sand & Gravel Co., Coleridge, Neb. $25,000. Incorporators: Raymond, Marvin, Lawrence, Erna and Helena Brockmann.

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have over 20 years experience

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•

DRACCO CORPORATION

4077 E. 116th Street

CLEVELAND, - - OHIO

We also manufacture Spray Nozzles, Sand Classifiers, and the Concenco Duplex (Diagonal Deck) Washing Table for sand and gravel.

It's the "Tops" in

Fine Screening

THE Leahy Vibrating Screen shown with Concenco Spray Nozzles applied

That's the news being broadcast throughout the industry by users of Leahy Screens, who are securing record accuracy and economy in the uniform fine grading of wet or dry material from 2" to 100-mesh.

Many advanced features contribute to this dependable performance:—

Super-strength frame, electrically welded.
Outer encasement of vibrator mechanism is built integral with bridge structure.
Double enclosure provided for internal parts of vibrator.

The proved vibrating principle, and the service-tested construction of Leahy Screens, insure new low maintenance, long life and increased screening efficiency.

Write for Bulletin

THE ORIGINAL DEISTER CONCENTRATOR COMPANY

911 Glasgow Ave. Incorporated 1906 Ft. Wayne, Ind.

BUYERS' GUIDE

A Directory of Pit and Quarry Advertisers Indexed According to Product.

Although every effort is made to insure accuracy and completeness in these listings the publisher cannot accept responsibility for errors or omissions. Any mistakes discovered will gladly be rectified.

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*Warren Brothers Roads Co.

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*Fuller Company.
Jackson & Church Co.
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*Link Belt Co.
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*Fuller Company
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Flexible Steel Lacing Co.

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*Sprout, Waldron & Co.

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*Hendrick Mfg. Co.
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Jackson & Church Co.
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*Robins Conveying Belt Co.
*Sprout, Waldron & Co.
*Universal Crusher Co.

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Atlas Powder Co.

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*Ensign-Bickford Co.

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Hollostone Co.
Multiplex Concrete Machinery Co.
Stearns Mfg. Co.

Block Machines (Power Press, Concrete)
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Hollostone Co.
Multiplex Concrete Machinery Co.
R & L Concrete Machinery Co.
Stearns Mfg. Co.

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*Haiss Mfg. Co., Geo.
*Sauerman Bros., Inc.
*Sprout, Waldron & Co.

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*Sly Mfg. Co., W. W.

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*Blaw-Knox Co.
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Babcock & Wilcox Co.

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Hoffman Bros. Drilling Co.
Pennsylvania Drilling Co.

Brick Machines (Concrete)
Dunn Mfg. Co., W. E.
Hollostone Co.
R & L Concrete Machinery Co.
Stearns Mfg. Co.

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Jackson & Church Co.
Stearns Mfg. Co.

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National Wire Cloth Co.
*Tyler Co., W. S.

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Buckets (Clamshell, Orange-Peel, Etc.)
*Blaw-Knox Co.
*Haiss Mfg. Co., Geo.
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Owen Bucket Co.
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*Brooks Equip. & Mfg. Co.
*Dempster Bros., Inc.
*Jaeger Machine Co.

Buckets (Dragline—Cableway)
*Bucyrus-Erie Co.
*Link-Belt Co.
*Sauerman Bros., Inc.
Taylor-Wharton Iron & Steel Co.

Buckets (Elevator and Conveyor)
Haiss Mfg. Co., Geo.
*Hendrick Mfg. Co.
*Jeffrey Mfg. Co.
*Link-Belt Co.
Manganese Steel Forge Co.
McLanahan and Stone Corp.
*Robins Conveying Belt Co.
Smith Engr. Works
*Sprout, Waldron & Co.
Taylor-Wharton Iron & Steel Co.

Buggies (Dump)
Athey Truss Wheel Co.
*Easton Car & Constr. Co.
*LeTourneau, Inc., R. G.

Bulk-Cement Storage Plants
Heltzel Steel Form & Iron Co.
*Sprout, Waldron & Co.

Bulldozers
*LeTourneau, Inc., R. G.

Burners (Oil)
Babcock & Wilcox Co.

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*American Steel & Wire Co.
Leschen & Sons Rope Co., A.
*Link-Belt Co.
*Sauerman Bros., Inc.

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*Calcium Chloride Association

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Atlas Powder Co.

Caps (Blasting, Electric)
Atlas Powder Co.

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*Link-Belt Co.

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*Jeffrey Mfg. Co.
*Link-Belt Co.

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*Link-Belt Co.
*Robins Conveying Belt Co.
Smith Engr. Works
*Sprout, Waldron & Co.

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*Easton Car & Constr. Co.
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Multiplex Concrete Machinery Co.

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Jackson & Church Co.

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*Austin-Western Road Machy. Co.
*Easton Car & Constr. Co.

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Babcock & Wilcox Co.
*Eagle Iron Works
Frog Switch & Mfg. Co.
Hetherington & Berner, Inc.
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*Jeffrey Mfg. Co.
*Kennedy-Van Saun Mfg. and Eng. Corp.
*Link-Belt Co.
McLanahan and Stone Corp.
*Robins Conveying Belt Co.
*Sprout, Waldron & Co.
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Jackson & Church Co.

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Heltzel Steel Form & Iron Co.
*Jaeger Machine Co.
*Sprout, Waldron & Co.

Chain Attachments
Taylor-Wharton Iron & Steel Co.

Chain (Dredge and Shovel) Manganese Steel Forge Co.
Taylor-Wharton Iron & Steel Co.

Chain Drives
*Jeffrey Mfg. Co.
*Link-Belt Co.

Chain (Elevating and Conveying)
*Haiss Mfg. Co., Geo.
*Jeffrey Mfg. Co.
*Link-Belt Co.
Manganese Steel Forge Co.
*Sprout, Waldron & Co.
Taylor-Wharton Iron & Steel Co.

Chutes and Chute Liners
*Haiss Mfg. Co., Geo.
*Hendrick Mfg. Co.
*Jeffrey Mfg. Co.
*Link-Belt Co.
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McLanahan and Stone Corp.
*Robins Conveying Belt Co.
*Smidth & Co., F. L.
*Sprout, Waldron & Co.
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Classifiers
Bradley Pulverizer Co.
*Deister Machine Co.
*Kennedy-Van Saun Mfg. and Eng. Corp.
Lewistown Foundry & Machine Co.
*Link-Belt Co.
*Nordberg Mfg. Co.

Clips (Wire Rope)
*American Steel & Wire Co.
Leschen & Sons Rope Co., A.

Clutches
*Jeffrey Mfg. Co.
*Link-Belt Co.
*Sprout, Waldron & Co.

Coal-Pulverizing Equipment
*Allis-Chalmers Mfg. Co.
Babcock & Wilcox Co.
Bradley Pulverizer Co.
Gay, Rubert M.
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*Williams Patent Crusher & Pulverizer Co.

Compressors (See Air Compressors)

Concentrators (Slurry)
*Deister Concentrator Co.

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*Chicago Pneumatic Tool Co.
Gardner-Denver Co.

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*Blaw-Knox Co.
*Jaeger Machine Co.

Condensers
*Chicago Pneumatic Tool Co.

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*Link-Belt Co.
Smith Engr. Works

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*Haiss Mfg. Co., Geo.
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*Link-Belt Co.
*Robins Conveying Belt Co.

Conveyors and Elevators
Allen-Sherman-Hoff Co.

* See also information in the 1938 Pit and Quarry HANDBOOK.

Stripping limestone with a LeTourneau U-12 Carryall Scraper and "Caterpillar" D8 tractor at Michigan Limestone and Chemical Company at the rate of 9 cu. yds. per trip.

(Inset) Building roadways and constructing dikes with the same combination furnishes Michigan Limestone with a low-cost solution to the transportation problem.

PURCHASED FOR ONE DUTY

. . . now assigned to 3

As a means of lowering stripping costs, Michigan Limestone and Chemical Company placed a LeTourneau 12-Yard Carryall Scraper in service at their Rogers City quarry.

On this kind of work the Carryall proved it can do more than was bargained for. It strips overburden at the rate of over 100 yards per hour . . . then, down in the quarry, it does secondary stripping of blasted limestone rock and fines.

. . . then, to cinch the title, "jack-of-all trades" . . . and a MASTER of each, job engineers found it ideal for constructing their dikes for settlement basins . . . and building and maintaining roads, to, and on the fines dump, with but little time out from regular duties.

In mining and quarrying, LeTourneau Carryalls offer much and ask little — saving time and money at a rate that soon clears their initial cost. They ask no favors for they have earned their reputations on the world's really tough jobs . . . it's the "pioneering spirit" and stock from which they are built that keeps 'em going in most any formation.

For facts or recommendations and estimates on YOUR job: See your nearest "Caterpillar" dealer . . . or write us.

LETOURNEAU

R. G. LeTOURNEAU, INC., PEORIA, ILLINOIS; STOCKTON, CALIFORNIA. Cable Address: "Bobletorno"

Manufacturers of: Angledozers*, Buggies*, Bulldozers, Carryall* Scrapers, Cranes, Drag Scrapers, Power Control Units, Rooters*, Treedozers.

* Name registered U. S. Patent Office.

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*Chicago Pneumatic Tool Co.

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Sturtevant Mill Co.
*Universal Crusher Co.
Williams Patent Crusher & Pulverizer Co

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Bucyrus-Erie Co.
Jackson & Church Co.
*Lima Locomotive Works
Link-Belt Co.
*Manitowoc Engineering Works
Marion Steam Shovel Co.
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Pennsylvania Drilling Co.

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*Chicago Pneumatic Tool Co.
Cleveland Rock Drill Co.
Gardner-Denver Co.

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Pennsylvania Drilling Co.

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Hoffman Bros. Drilling Co.
Pennsylvania Drilling Co.

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Cleveland Rock Drill Co.
Gardner-Denver Co.

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Cleveland Rock Drill Co.
Gardner-Denver Co.
Jeffrey Mfg. Co.

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Jackson & Church Co.
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Lewistown Fdry & Mch. Co.
Lime & Hydrate Plants Co.
McLanahan and Stone Corp.
Traylor Engr. & Mfg. Co.
Tyler Co., W. S.

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Blaw-Knox Co.
*Dracco Corp.
Parsons Engineering Corp.
*Schneible Co., Claude B.
*Sly Mfg. Co., W. W.
Western Precipitation Corp.

Dust Collecting Systems
Allen-Sherman-Hoff Co.
Allis-Chalmers Mfg. Co.
Blaw-Knox Co.
*Dracco Corp.
Parsons Engineering Corp.
Raymond Pulverizer Div. of Combustion Engr. Co., Inc.
*Schneible Co., Claude B.
*Sly Mfg. Co., W. W.
Western Precipitation Corp.

Dust Conveying Systems
Allen-Sherman-Hoff Co.
Blaw-Knox Co.
*Dracco Corp.
Fuller Company
Parsons Engineering Corp.
*Schneible Co., Claude B.
*Sly Mfg. Co., W. W.
Western Precipitation Corp

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Parsons Engineering Corp.
*Schneible Co., Claude B.
*Sly Mfg. Co., W. W.
Western Precipitation Corp

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Bradley Pulverizer Co.
Fuller Company
Hetherington & Berner, Inc.
Holmes & Bros., Inc., Robt.
Kennedy-Van Saun Mfg. and Eng. Corp.
Lime & Hydrate Plants Co.
McLanahan and Stone Corp.
Robins Conveying Belt Co.
*Smidth & Co., F. L.
Sprout, Waldron & Co.
Sturtevant Mill Co.
Traylor Engr. & Mfg. Co.

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Engines (Diesel)
Caterpillar Tractor Co.
*Chicago Pneumatic Tool Co.
Murphy Diesel Co., Ltd.
National Supply Co. of Del.
Nordberg Mfg. Co.

Engines (Internal-Combustion)
Caterpillar Tractor Co.
*Chicago Pneumatic Tool Co.
Murphy Diesel Co., Ltd.
National Supply Co. of Del.
Nordberg Mfg. Co.

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Morris Machine Works
Nordberg Mfg. Co.

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Haiss Mfg. Co., Geo.

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Atlas Powder Co.

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Stulz-Sickles Co.

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*Jeffrey Mfg. Co.
Kennedy-Van Saun Mfg. and Eng. Corp.

Feeders
Allis-Chalmers Mfg. Co.
Babcock & Wilcox Co.
Bradley Pulverizer Co.
Fuller Company
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*Jeffrey Mfg. Co.
Kennedy-Van Saun Mfg. and Eng. Corp.
Link-Belt Co.
Robins Conveying Belt Co.
Smith Engr. Works
Sprout, Waldron & Co.
Traylor Engr. & Mfg. Co.
*Universal Crusher Co.

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*Jeffrey Mfg. Co.
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Sprout, Waldron & Co.

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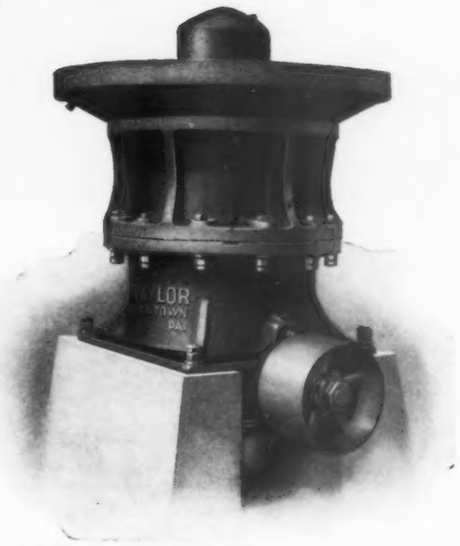
Traylor Engr. & Mfg. Co.

Grizzlies
Allis-Chalmers Mfg. Co.

* See also information in the 1938 Pit and Quarry HANDBOOK.



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of course, you want low costs-
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TRAYLOR
TY REDUCTION CRUSHER

because, with it, maximum production is secured, with minimum expenditure for power and maintenance. This is not a mere claim, but the consensus of the voluntary opinions of a great many actual users.

The design makes this possible:—cast steel frame; positive force feed lubrication; absolute dust exclusion; roller bearings; Traylor original, patented non-chokable Bell Head and Curved Concaves — an unbeatable combination.

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SEATTLE 6311 22nd Ave., N. E.
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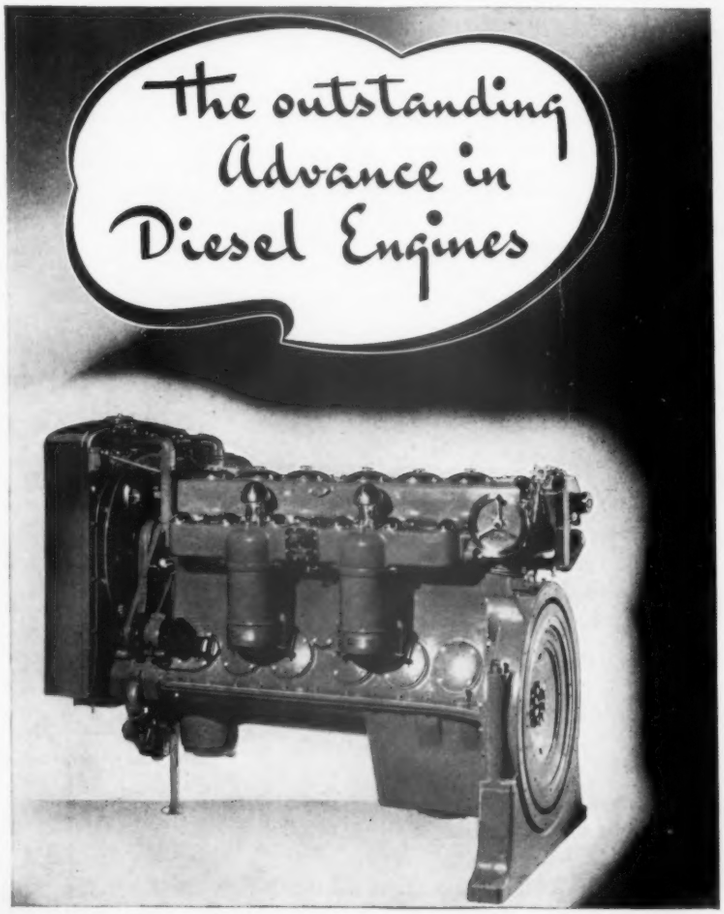
B. C. EQUIPMENT CO. Vancouver, B. C. Canada
MAQUINARIA Isabel De Catolica 40, Mexico, D.F.
MANILA MACH. & SUPPLY CO. Manila and Baguio, P. I.

Export Department—104 Pearl St., New York City. Foreign Sales Agencies: London, Lima, Sao Paulo, Rio de Janeiro, Buenos Aires, Santiago, Valparaiso, Antofagasta, Iquique, Oruro
European Works—Usines Carels Freres, Ghent, Belgium



IT is simple . . . No separate starting engine . . . Fuel injector and pump are combined in one unit—interchangeable — replaceable in a minute's time — eliminating at once many present Diesel difficulties.

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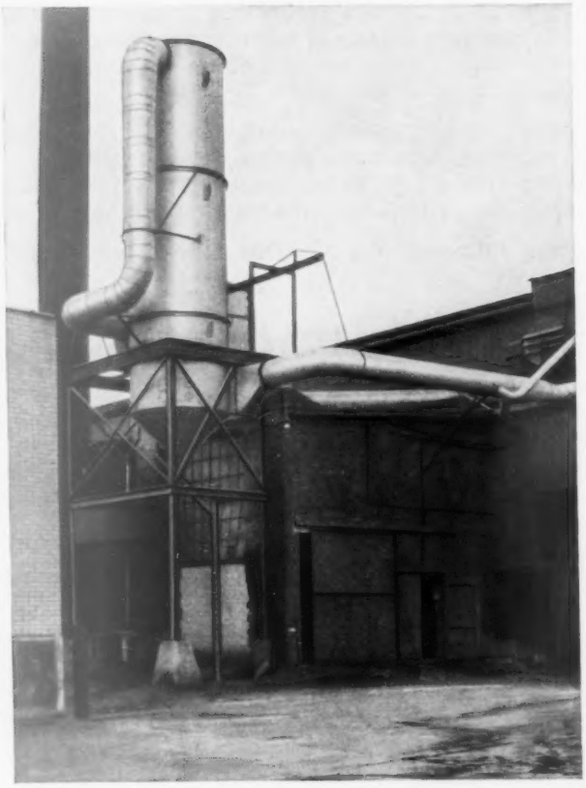
MURPHY DIESEL

End Dustruction

IN YOUR PLANT with the SCHNEIBLE MULTI-WASH DUST COLLECTOR...



Dust is destructive! It destroys machinery through abrasion and may impair the health of workers. The Schneible Multi-Wash Dust Collector positively and efficiently collects dust without damage to itself because it employs no bags, screens or filters to clog, or moving parts to wear from dust abrasion. It uses only clear water under normal pressure to wash the air. All parts are copper bearing alloy steel, and they are protected against abrasion by the water used in the washing process.

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DUST SUPPRESSION ENGINEERS
3951 LAWRENCE AVENUE, CHICAGO — OFFICES IN PRINCIPAL CITIES

BUYERS' GUIDE

A Directory of Pit and Quarry Advertisers Indexed According to Product.

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***Eagle Iron Works**
***Hendrick Mfg. Co.**
*Huron Industries Co.
***Kennedy-Van Saun Mfg. and Eng. Corp.**
Lewistown Fdry. & Mach. Co.
Manganese Steel Forge Co.
***Robins Conveying Belt Co.**
Smith Engr. Works
Universal Road Machy. Co.

Guards (Wire)
Manganese Steel Forge Co.
National Wire Cloth Co.

Guns (Hydraulic)
Hetherington & Berner, Inc.
Taylor Forge & Pipe Works

Hammer Mills (See Crushers—Hammer)

Heaters (Bitumen)
*Easton Car & Constr. Co.

Hoists
***Chicago Pneumatic Tool Co.**
Gardner-Denver Co.
Hetherington & Berner, Inc.
Jackson & Church Co.
***Jaeger Machine Co.**
*Jeffrey Mfg. Co.
***Link-Belt Co.**
McLanahan and Stone Corp.
***Sauerman Bros., Inc.**
Smith Engr. Works
***Sprout, Waldron & Co.**

Hoppers
***Hendrick Mfg. Co.**
***Link-Belt Co.**
Manganese Steel Forge Co.

Hose (Air, Steam and Water)
***Chicago Pneumatic Tool Co.**
***Cincinnati Rubber Mfg. Co.**
Quaker City Rubber Co.
Republic Rubber Co.

Hose (Fire & Suction)
Quaker City Rubber Co.

Hose (Radiator-Engine Cooling)
Quaker City Rubber Co.
Republic Rubber Co.

Hose Couplings (See Couplings)

Hydrators
Lime & Hydrate Plants Co.

Hydrate Plants (Complete)
Lime & Hydrate Plants Co.

Hydraulic Guns (See Guns—Hydraulic)

Idlers
*Jeffrey Mfg. Co.
***Link-Belt Co.**
***Robins Conveying Belt Co.**
Smith Engr. Works
***Sprout, Waldron & Co.**

Indicators (Material Level)
*Fuller Company

Joist and Slab Machines (Concrete)
R & L Concrete Machinery Co.

Kilns and Coolers (Rotary)
***Allis-Chalmers Mfg. Co.**
***Kennedy-Van Saun Mfg. and Eng. Corp.**
Lime & Hydrate Plants Co.
***Smidth & Co., F. L.**
***Traylor Engr. & Mfg. Co.**

Kilns (Vertical)
Lime & Hydrate Plants Co.

Kominuters
*Smidth & Co., F. L.

Ladders (Agitating Dredge)
*Eagle Iron Works

Ladders (Hydraulic Dredge)
*Eagle Iron Works

Lime-Handling Equipment
***Fuller Company**
Jackson & Church Co.
*Jeffrey Mfg. Co.
***Link-Belt Co.**
***Raymond Pulverizer Div. of Combustion Engr. Co., Inc.**
***Robins Conveying Belt Co.**

Lime and Hydrating Plants
Lime & Hydrate Plants Co.
***Traylor Engr. & Mfg. Co.**

Lime Kilns
***Kennedy-Van Saun Mfg. and Eng. Corp.**
Lime & Hydrate Plants Co.

Lime Plants (Complete)
Lime & Hydrate Plants Co.

Linings (Ball- and Tube-Mill) (See Mill Liners and Linings)

Loaders and Unloaders
***Bucyrus-Erie Co.**
***Fuller Company**
*Haiss Mfg. Co., Geo.
*Jeffrey Mfg. Co.
***Link-Belt Co.**
***Robins Conveying Belt Co.**
***Sprout, Waldron & Co.**

Locomotives (Diesel)
*Whitcomb Locomotive Co.

Locomotives (Diesel-Electric)
*Whitcomb Locomotive Co.

Locomotives (Electric, Gas, and Steam)
*Lima Locomotive Works
*Whitcomb Locomotive Co.

Locomotives (Gas-Electric)
*Whitcomb Locomotive Co.

Locomotives (Oil-Electric)
*Whitcomb Locomotive Co.

Locomotives (Trolley-Battery)
*Jeffrey Mfg. Co.

Magnetic Pulleys (See Pulleys, Magnetic)

Manganese Steel
Frog Switch & Mfg. Co.
Manganese Steel Forge Co.
Taylor-Wharton Iron & Steel Co.

Manganese Steel (Plates and Sheets)
Frog Switch & Mfg. Co.
Manganese Steel Forge Co.
Taylor-Wharton Iron & Steel Co.

Mechanical Rubber Goods
***Cincinnati Rubber Mfg. Co.**
Quaker City Rubber Co.
Republic Rubber Co.

Mill Liners and Linings
Babcock & Wilcox Co.
Carnegie-Illinois Steel Corp.
*Jeffrey Mfg. Co.
***Kennedy-Van Saun Mfg. and Eng. Corp.**
***Smidth & Co., F. L.**
***Traylor Engr. & Mfg. Co.**

Mills (Ball, Tube, etc.)
***Allis-Chalmers Mfg. Co.**
***Traylor Engr. & Mfg. Co.**

Mills (Grinding) (See also Crushers—Hammer)
***Allis-Chalmers Mfg. Co.**
***American Pulverizer Co.**
Babcock & Wilcox Co.
Bradley Pulverizer Co.
*Brooks Equip. & Mfg. Co.
Jackson & Church Co.
*Jeffrey Mfg. Co.
***Kennedy-Van Saun Mfg. and Eng. Corp.**
Lewistown Fdry. & Mach. Co.
***Raymond Pulverizer Div. of Combustion Engr. Co., Inc.**
***Smidth & Co., F. L.**
***Sprout, Waldron & Co.**
***Traylor Engr. & Mfg. Co.**
*Universal Crusher Co.
***Williams Patent Crusher & Pulverizer Co.**

Mixers
Multiplex Concrete Machinery Co.
Stearns Mfg. Co.

* See also information in the 1938 Pit and Quarry HANDBOOK.

Motors and Generators
*Allis-Chalmers Mfg. Co.

Motors (Internal-Combustion) (See Engines — Internal-Combustion)

Moulds and Forms (Concrete)
Dunn Mfg. Co., W. E.
Hollostone Co.
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R & L Concrete Machinery Co.
Stearns Mfg. Co.

Nails
*American Steel & Wire Co.

Netting (Locomotive Stack)
*Tyler Co., W. S.

Nozzles (Gravel Washing)
*Deister Concentrator Co.

Nozzles (Hydraulic) (See Guns —Hydraulic)

Nozzles (Spray)
*Deister Concentrator Co.

Packings
*Cincinnati Rubber Mfg. Co.
Quaker City Rubber Co.
Republic Rubber Co.

Pallets
Multiplex Concrete Machinery Co.
Stearns Mfg. Co.

Pans (Wet and Dry)
Jackson & Church Co.

Partitions (Wire)
National Wire Cloth Co.

Paving Mixers
*Jaeger Machine Co.

Perforated Metal Plates
*Allis-Chalmers Mfg. Co.
Chicago Perforating Co.
*Hendrick Mfg. Co.
*Sprout, Waldron & Co.

Pipe (Water, Gas, Low Pressure Steam)
Hetherington & Berner, Inc.

Pipe, Dredge (Floating and Shore)
Naylor Pipe Co.
Taylor Forge & Pipe Works

Pipe Flanges
Hetherington & Berner, Inc.
Naylor Pipe Co.
Taylor Forge & Pipe Works

Pipe Fittings
Hetherington & Berner, Inc.

Pipe Forms (Concrete)
Concrete Pipe Machinery Co.
Quinn Wire & Iron Works
R & L Concrete Machinery Co.

Pipe Machines (Concrete)
Concrete Pipe Machinery Co.
Quinn Wire & Iron Works
R & L Concrete Machinery Co.

Pipe (Spiral)
Naylor Pipe Co.
Taylor Forge & Pipe Co.

Pipe (Welded)
Naylor Pipe Co.
Taylor Forge & Pipe Co.

Plants (Aggremeter) (See Aggremeter Plants)

Plug Valves (See Valves)

Pneumatic Conveying Systems (See Conveyors—Pneumatic)

Pneumatic Drills (See Drills, Rock)

Poidometers
Schaffer Poidometer Co.

Portable Conveyors
*Fuller Company
Haiss Mfg. Co., Geo.
*Jeffrey Mfg. Co.
*Link-Belt Co.
*Robins Conveying Belt Co.
*Universal Crusher Co.

Portable Crushing and Screening Plants
*Austin-Western Road Machy. Co.
*Gruendler Crusher & Pulverizer Co.
*Jeffrey Mfg. Co.
*Universal Crusher Co.
*Williams Patent Crusher & Pulverizer Co.

Portable Engines (See Engines —Internal Combustion)

Portable Loaders (See Loaders and Unloaders)

Portable Washing Plants
*Universal Crusher Co.

Powder, (Black, Blasting) (See Explosives)

Power Cables (Rubber Clad)
*American Steel & Wire Co.

Power Shovels (See Shovels, Electric, Internal Combustion and Steam)

Power Tampers (Concrete)
Hollostone Co.
Multiplex Concrete Machinery Co.
Stearns Mfg. Co.

Power Units (Internal-Combustion)
Caterpillar Tractor Co.
*Chicago Pneumatic Tool Co.
Murphy Diesel Co., Ltd.
National Supply Co. of Del.
*Nordberg Mfg. Co.

Precipitators
*Western Precipitation Corp.

Pre-formed Wire Rope
*American Cable Division of The American Chain & Cable Co., Inc.
Broderick & Bascom Rope Co.
*Leschen & Sons Rope Co., A.

Press Machines (Hand, Concrete)
Hollostone Co.
Multiplex Concrete Machinery Co.
Stearns Mfg. Co.

Presses (Brick & Block)
Jackson & Church Co.

Proportioning Equipment
*Blaw-Knox Co.
Heltzel Steel Form & Iron Co.
Jackson & Church Co.
*Jaeger Machine Co.
Schaffer Poidometer Co.

Pulleys
*Huron Industries Co.
Sprout, Waldron & Co.

Pulleys (Magnetic)
*Sprout, Waldron & Co.

Pulleys (Wing)
*Sprout, Waldron & Co.

Pulverized Fuel Systems
Babcock & Wilcox Co.
Gay, Rubert M.
*Kennedy-Van Saun Mfg. and Eng. Corp.
*Raymond Pulverizer Div. of Combustion Engr. Co., Inc.
Universal Road Machy. Co.

Pulverizers (See also Crushers, Mills, etc.)
*American Pulverizer Co.
*Austin-Western Road Machy. Co.
Babcock & Wilcox Co.
Bradley Pulverizer Co.
*Brooks Equip. & Mfg. Co.
*Gruendler Crusher & Pulverizer Co.
*Jeffrey Mfg. Co.
*Kennedy-Van Saun Mfg. and Eng. Corp.
Lewistown Foundry & Machine Co.
New Holland Machine Co.
*Raymond Pulverizer Div. of Combustion Engr. Co., Inc.
*Smidth & Co., F. L.
Sturtevant Mill Co.
Traylor Engr. & Mfg. Co.
*Universal Crusher Co.
*Williams Patent Crusher & Pulverizer Co.

Pump Parts
Taylor-Wharton Iron & Steel Co.

Pump Valves (See Valves Pump)

Pumps (Air-Lift)
*Chicago Pneumatic Tool Co.
*Fuller Company

Pumps (Bulk Cement)
*Fuller Company

Pumps (Cement Slurry)
Allen-Sherman-Hoff Co.
*Morris Machine Works
*Smidth & Co., F. L.

Pumps (Centrifugal)
Allen-Sherman-Hoff Co.
*Allis-Chalmers Mfg. Co.
Erie Pump & Engine Works
Hetherington & Berner, Inc.
*Jaeger Machine Co.
Kansas City Hay Press Co.
*Morris Machine Works
Peerless Pump Division of The Food Machy. Corp.

Pumps (Dewatering)
*Allis-Chalmers Mfg. Co.

* See also information in the 1938 Pit and Quarry HANDBOOK.

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MORE FOOTAGE PER SHIFT EVERY SHIFT

WITH GARDNER-DENVER SINKERS

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BUYERS' GUIDE

A Directory of Pit and Quarry Advertisers Indexed According to Product.

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Erie Pump & Engine Works
*Morris Machine Works
Peerless Pump Division of The Food Machy Corp.

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*Allis-Chalmers Mfg. Co.
*Bucyrus-Erie Co.
Erie Pump & Engine Works
Hetherington & Berner, Inc.
Kansas City Hay Press Co.
*Morris Machine Works

Pumps (Sand and Gravel)
Allen-Sherman-Hoff Co.
*Allis-Chalmers Mfg. Co.
Erie Pump & Engine Works
Hetherington & Berner, Inc.
Kansas City Hay Press Co.
*Morris Machine Works

Pumps (Sump)
*Chicago Pneumatic Tool Co.
Peerless Pump Division of The Food Machy Corp.

Pumps (Turbine)
*Allis-Chalmers Mfg. Co.
Erie Pump & Engine Works
*Morris Machine Works
Peerless Pump Division of The Food Machy Corp.

Pumps (Vacuum)
*Chicago Pneumatic Tool Co.
*Fuller Company

Pumps (Vertical)
*Allis-Chalmers Mfg. Co.
Erie Pump & Engine Works
*Morris Machine Works
Peerless Pump Division of The Food Machy Corp.

Pumps (Well)
*Allis-Chalmers Mfg. Co.
Erie Pump & Engine Works
*Morris Machine Works
Peerless Pump Division of The Food Machy Corp.

Racks (Curing)
Hollostone Co.
Multiplex Concrete Machinery Co.
Stearns Mfg. Co.

Ready-Mixed Concrete Plants
Heltzel Steel Form & Iron Co.
*Jaeger Machine Co.

Recuperators
*Manitowoc Engineering Works

Rock Drills (See Drills—Rock)

Rod Mills
Jackson & Church Co.
*Kennedy-Van Saun Mfg. and Eng. Corp.
*Traylor Engr. & Mfg. Co.

Rods (Welding)
Stulz-Sickles Co.
Taylor-Wharton Iron & Steel Co.

Rope (Wire) (See Wire Rope)

Sand and Gravel Handling Equipment
*Link-Belt Co.

Sand Separators
*Jeffrey Mfg. Co.
*Link-Belt Co.
McLanahan and Stone Corp.
Smith Engr. Works

Sand—Lime—Brick Machinery
Jackson & Church Co.

Sand-Settling Tanks
*Jeffrey Mfg. Co.
*Link-Belt Co.
*Nordberg Mfg. Co.
Smith Engr. Works

Scrapers (Power Drag)
*Austin-Western Road Machy. Co.
*Link-Belt Co.
*Sauerman Bros., Inc.

Scrapers (Wagon)
*Bucyrus-Erie Co.

Screens
*Allis-Chalmers Mfg. Co.
Bacon, Inc., Earle C.
Carnegie-Illinois Steel Corp.
Chicago Perforating Co.
Cleveland Wire Cloth & Mfg. Co.
*Deister Concentrator Co.
*Deister Machine Co.
*Eagle Iron Works
Gay, Rubert M.
*Gruendler Crusher & Pulverizer Co.
*Haiss Mfg. Co., Geo.
*Hendrick Mfg. Co.
*Jeffrey Mfg. Co.
*Kennedy-Van Saun Mfg. and Eng. Corp.
Lewistown Foundry & Machine Co.
*Link-Belt Co.
Ludlow-Saylor Wire Co.
Manganese Steel Forge Co.
McLanahan and Stone Corp.
National Wire Cloth Co.
*Nordberg Mfg. Co.
*Robins Conveying Belt Co.
Simplicity Engr. Co.
Smith Engr. Works
*Sprout, Waldron & Co.
Sturtevant Mill Co.
Taylor-Wharton Iron & Steel Co.
*Traylor Engr. & Mfg. Co.
*Tyler Co., W. S.
*Universal Crusher Co.
Universal Road Machy. Co.

Screens (Vibrating or Shaking)
*Allis-Chalmers Mfg. Co.
*Austin-Western Road Machy. Co.
*Deister Concentrator Co.
*Deister Machine Co.
*Gruendler Crusher & Pulverizer Co.
*Huron Industries Co.
*Jeffrey Mfg. Co.
*Kennedy-Van Saun Mfg. and Eng. Corp.
Lewistown Foundry & Machine Co.
*Link-Belt Co.
McLanahan and Stone Corp.
New Holland Machine Co.
*Nordberg Mfg. Co.
*Robins Conveying Belt Co.
Screen Equipment Co.
Smith Engr. Works
*Sprout, Waldron & Co.
Sturtevant Mill Co.
*Tyler Co., W. S.
*Universal Crusher Co.
*Williams Patent Crusher & Pulverizer Co.

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*Traylor Engr. & Mfg. Co.
*Tyler Co., W. S.

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*Huron Industries Co.

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Separators (Slurry)
*Smidth & Co., F. L.

Sheaves
*Allis-Chalmers Mfg. Co.
*Eagle Iron Works
*Gruendler Crusher & Pulverizer Co.
Haiss Mfg. Co., Geo.
Hetherington & Berner, Inc.
*Jeffrey Mfg. Co.
*Link-Belt Co.
*Jeffrey Mfg. Co.
McLanahan and Stone Corp.
*Sprout, Waldron & Co.

Shovels (Electric, Internal-Combustion and Steam)
*Austin-Western Road Machy. Co.
*Bay City Shovels, Inc.
*Bucyrus-Erie Co.
*Lima Locomotive Works
*Link-Belt Co.
*Manitowoc Engineering Works
Marion Steam Shovel Co.
Northwest Engr. Co.

Silos
*Smidth & Co., F. L.

Skip Hoists and Skips
*Allis-Chalmers Mfg. Co.
Hetherington & Berner, Inc.
*Jeffrey Mfg. Co.
*Link-Belt Co.
*Robins Conveying Belt Co.

Sleeves (Dredge)
*Cincinnati Rubber Mfg. Co.
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Speed Reduction Units
*Huron Industries Co.
*Link-Belt Co.

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Holmes & Bros., Inc., Robt.

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Sprays
*Deister Concentrator Co.

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*Jeffrey Mfg. Co.
*Link-Belt Co.
*Sprout, Waldron & Co.

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*Calcium Chloride Association

Stackers
*Jeffrey Mfg. Co.

Steel (Alloy)
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Steel (High Tensile)
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Taylor-Wharton Iron & Steel Co.

Steel (Open Hearth)
Manganese Steel Forge Co.
Taylor-Wharton Iron & Steel Co.

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Steel Plate Construction
Heltzel Steel Form & Iron Co.
Hetherington & Berner, Inc.
Holmes & Bros., Inc., Robt.
Manganese Steel Forge Co.
*Sprout, Waldron & Co.

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Babcock & Wilcox Co.

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Owen Bucket Co.

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*Haiss Mfg. Co., Geo.
*Jeffrey Mfg. Co.
*Link-Belt Co.
*Sauerman Bros., Inc.

Sweeping Systems
Allen-Sherman-Hoff Co.

Tamp Machines (Hand, Concrete)
Hollostone Co.
Multiplex Concrete Machinery Co.
Stearns Mfg. Co.

Tanks
Bartlett & Snow Co., C. O.
*Hendrick Mfg. Co.
Heltzel Steel Form & Iron Co.
Jackson & Church Co.
*Jeffrey Mfg. Co.
*Link-Belt Co.
*Schneible Co., Claude B.
*Traylor Engr. & Mfg. Co.

Tanks (Dewatering)
*Schneible Co., Claude B.

Tanks (Sand-Settling)
*Jeffrey Mfg. Co.
*Link-Belt Co.
Smith Engr. Works

Testing Sieves and Shakers
*Hendrick Mfg. Co.
*Tyler Co., W. S.

Tires (Truck, Passenger Car, Tractor)

Tools (Drill) (See Drilling Accessories)

Track & Track Material
Taylor-Wharton Iron & Steel Co.

Track Shifters
*Nordberg Mfg. Co.

Tractors
*Allis-Chalmers Mfg. Co.
Caterpillar Tractor Co.

Trailers (Dump)
Athey Truss Wheel Co.
*Easton Car & Constr. Co.
*LeTourneau, Inc., R. G.

Trailers (Industrial)
*Easton Car & Constr. Co.

Tramways (Aerial)
*American Steel & Wire Co.

Transformers
*Allis-Chalmers Mfg. Co.

Transmission Belting (See Belting)

Transmission Machinery
*Allis-Chalmers Mfg. Co.
*Gruendler Crusher & Pulverizer Co.
*Jeffrey Mfg. Co.
*Link-Belt Co.

Trippers
*Jeffrey Mfg. Co.
*Link-Belt Co.
*Robins Conveying Belt Co.

Truck Cranes (See Cranes)

Truck Mixers
*Blaw-Knox Co.
*Jaeger Machine Co.

Trucks (Lift or Elevating)
Barrett-Cravens Co.

Trucks and Trailers (See Motor Trucks)

Tube-Mills (See Mills—Ball, Tube, etc.)

Tubes (For Tire Casings)
Quaker City Rubber Co.

Turntables (Railway Industrial)
*Easton Car & Constr. Co.

Underground Loaders
*Allis-Chalmers Mfg. Co.

Unloaders (Box Car)
*Fuller Co.
*Jeffrey Mfg. Co.
*Link-Belt Co.

Valves (Pump)
*Cincinnati Rubber Mfg. Co.
Quaker City Rubber Co.
Taylor Forge & Pipe Works

Variable Speed Reducers or Transmissions
*Link-Belt Co.

Vibrating Screen Plate
Chicago Perforating Co.
*Hendrick Mfg. Co.
*Jeffrey Mfg. Co.
*Link-Belt Co.
Manganese Steel Forge Co.

Vibrating Screens (See Screens—Vibrating)

Vibrators
*Tyler Co., W. S.

Wagon Scrapers
Continental Roll & Steel Fdry. Co.

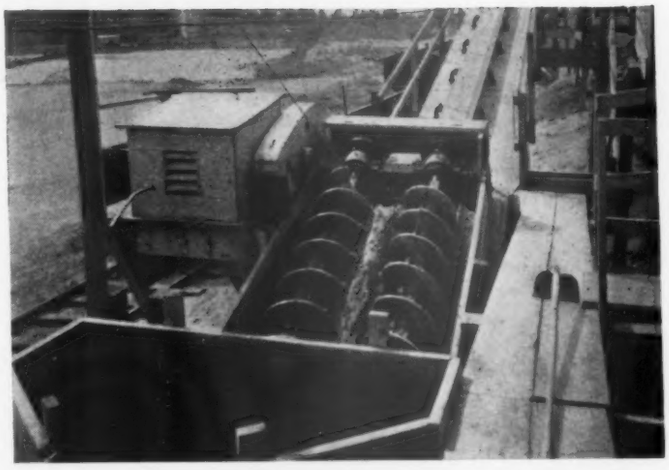
Wagons (Dump)
Athey Truss Wheel Co.
*Austin-Western Road Machy. Co.
*Easton Car & Constr. Co.
*LeTourneau, Inc., R. G.

Washers (Sand, Gravel and Stone)
*Allis-Chalmers Mfg. Co.
*Austin-Western Road Machy. Co.
*Eagle Iron Works
*Haiss Mfg. Co., Geo.
*Kennedy-Van Saun Mfg. and Eng. Corp.
Lewistown Foundry & Mach. Co.
*Link-Belt Co.
McLanahan and Stone Corp.
*Smidth & Co., F. L.
Smith Engr. Works
*Traylor Engr. & Mfg. Co.
*Tyler Co., W. S.
*Universal Crusher Co.
Universal Road Machy. Co.

Weighing Equipment (Automatic)
*Blaw-Knox Co.
*Fuller Co.
Heltzel Steel Form & Iron Co.
*Jaeger Machine Co.
Schaffer Poidometer Co.

Welding Bars, Wedge and Applicator (Nickel - Manganese Steel)
Stulz-Sickles Co.
Taylor-Wharton Iron & Steel Co.

* See also information in the 1938 Pit and Quarry HANDBOOK.



EAGLE SCREW WASHER

Daily recovers over six cars of sand formerly wasted

Eagle Screw Washer Daily Recovers Over Six Cars of Sand Formerly Wasted.

The Concrete Materials Corporation of Waterloo, Iowa, installed this 18 inch twin screw washer which recovers commercial sand able to qualify for the Illinois State Specifications. Before this installation only gravel was produced and the sand pumped back into the lake, a total loss.

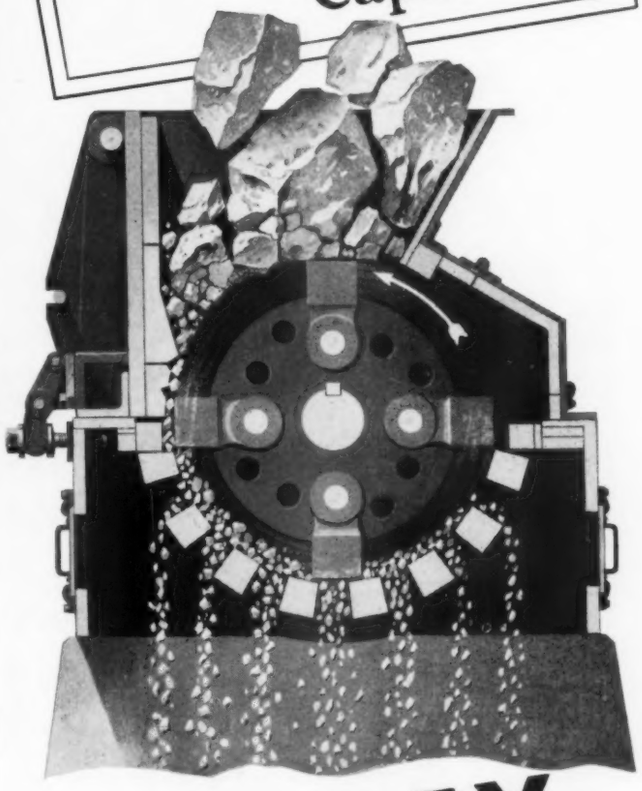
Two other pieces of EAGLE equipment play a very important part in the remarkable production record of the plant. A 40 foot "Swintek" ladder mounted on a barge is used for excavating, and a 20-inch twin screw EAGLE WASHER effectively washes and dewaters about 80 tons of sand per hour for mixing with gravel to meet the specifications for ballast.

This is only one of countless ways EAGLE WASHERS are building big profits for producers everywhere.

Our engineers are specialists in all aggregate washing problems. Let us help you solve yours Write today for details.

EAGLE IRON WORKS
DES MOINES, IOWA

Large Pieces for Large Capacities



JEFFREY

Miracle Hammer CRUSHERS

Reduce large pieces and large capacities of limestone, shale, slag and cement rock. This 'miracle hammer' crusher will take steam shovel size limestone and crush it into pieces 1", 2", 3" or 4" and under, in one operation . . . the one unit doing the work ordinarily done by two or more other types of crushers.

With a minimum initial investment you can reduce material to a uniform size at a lower cost . . . and enlarge your profits.

For reduction machinery . . . call on us.

The Jeffrey Manufacturing Company
917-99 North Fourth Street, Columbus, Ohio

BUYERS' GUIDE

A Directory of Pit and Quarry Advertisers Indexed According to Product.

Index to Advertisers on Page 112

Welding and Cutting Equipment
Stulz-Sickles Co.

Welding Rods
Bradley Pulverizer Co.
Stulz-Sickles Co.
Taylor-Wharton Iron & Steel Co.

Welding Service
Stulz-Sickles Co.

Welding Supplies
*American Steel & Wire Co.
Manganese Steel Forge Co.
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Well Drills (See Drills—Well)

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*Eagle Iron Works
Jackson & Church Co.
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Wheel Rims. See Rims—Wheel

Winches and Capstans
*Jeffrey Mfg. Co.
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*Robins Conveying Belt Co.
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Wire & Cable (Electric)
*American Steel & Wire Co.

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Cleveland Wire Cloth & Mfg. Co.
Ludlow-Saylor Wire Co.
Manganese Steel Forge Co.
National Wire Cloth Co.
*Robins Conveying Belt Co.
Taylor-Wharton Iron & Steel Co.
*Tyler Co., W. S.

Wire Rope
*American Cable Division of The American Chain & Cable Co., Inc.
*American Steel & Wire Co.
Broderick & Bascom Rope Co.
Leschen & Sons Rope Co., A.

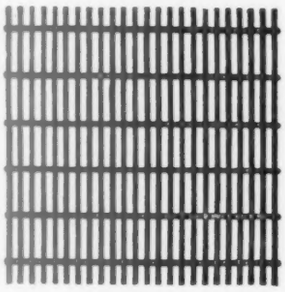
Wire Rope Fittings
*American Cable Division of The American Chain & Cable Co., Inc.
*American Steel & Wire Co.
Broderick & Bascom Rope Co.
Leschen & Sons Rope Co., A.

Wire Rope Slings
*American Cable Division of The American Chain & Cable Co., Inc.
*American Steel & Wire Co.
Broderick & Bascom Rope Co.
Leschen & Sons Rope Co., A.

Wire (Welding)
*American Steel & Wire Co.
Manganese Steel Forge Co.
Taylor-Wharton Iron & Steel Co.

Worm Gears (See Gears and Pinions)

* See also information in the 1938 Pit and Quarry HANDBOOK.



Rolled Slot

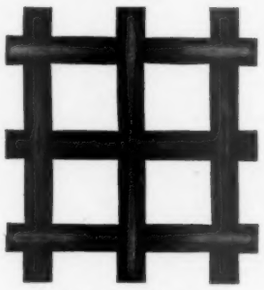
ALLOY No. 2

A super wearing Steel developed to resist the abrasion and vibration of modern screening demands.

"CLEVELAND" SCREENS

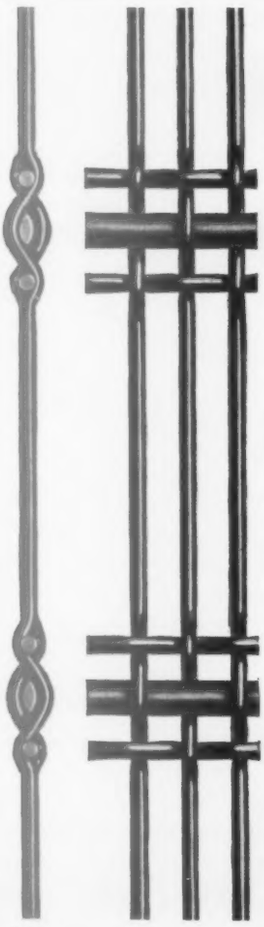
A wire cloth of guaranteed accuracy backed by fine workmanship and an effort to satisfy.

Available in Square Mesh and Rolled Slot. A trial will convince you of the superiority.



2 Mesh .162 Ga.

THE CLEVELAND WIRE CLOTH & MFG. COMPANY
574 E. 78th St. CLEVELAND, OHIO



STA-TRU

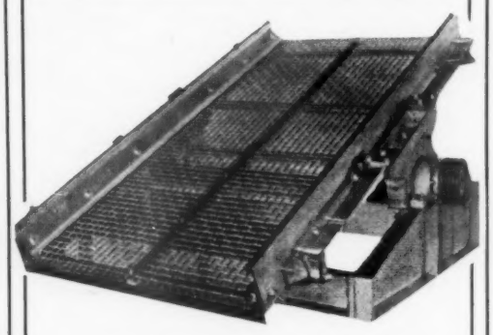
Long-Mesh Woven Wire Screens

made to work under tension and vibration.

The straight stay - bars carry ALL the tension. The crimps in the round wires can not be stretched or broken. The screen can not be caused to sag or split by the pull of the tensioning device.

LUDLOW-SAYLOR WIRE CO. ST. LOUIS

HURON



SCREENS

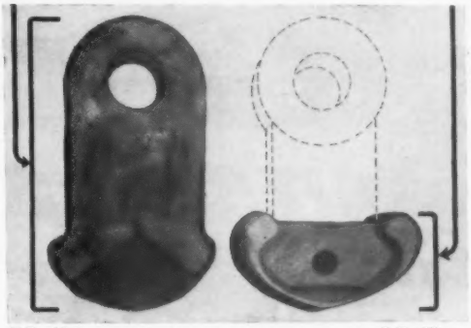
Start 1938 with the economies that go with Huron HEAVY DUTY Screens. The SKF Brute Bearings, Quick cloth change, and Deck Slope Adjustment are all factors in low maintenance as well as time saving features.

There is a type and size of screen in the complete Huron line for your every requirement. Write for information and prices.

HURON INDUSTRIES CO.
Alpena, Michigan

DO YOU THROW AWAY

THIS - - - or - - - THIS



55 lbs. - - - or - - - 15 lbs.

when you replace your hammers

Let us tell you the savings effected by using

ESCO RENEWABLE HEAD HAMMERS

These hammers have been used by several leading cement mills on the Pacific Coast for several years with complete success. Write today.

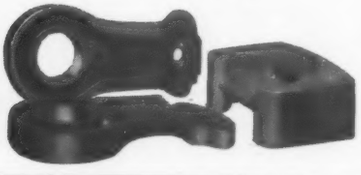
Patented

ELECTRIC STEEL FOUNDRY CO.

Portland, Oregon

Seattle, San Francisco, Los Angeles

Denver



The VANDERWERP RECUPERATOR *for* Rotary Kilns

The Recuperator is now accepted as the one and only air-quenching type of cooler offering adequate protection against excessive expansion in high-magnesia cements. It insures:

- ***Improved Quality of Cement***
- ***Better Grindability of Clinker***
- ***Maximum Fuel Economy***
- ***Highest Efficiency of Heat Recovery***
- ***Low Maintenance Cost***

Kiln operators interested in obtaining the maximum benefits from air quenching and heat recovery — with proven equipment — are requested to write, without obligation, for full particulars.

Manitowoc Engineering Works

Division of

Manitowoc Ship Building Company

GENERAL OFFICES AND PLANT
Manitowoc, Wisconsin

CHICAGO OFFICE
131 E. River St.

EXTRA PROFIT IN EVERY LOAD— *with*

WHITCOMB LOCOMOTIVES

● Rail haulage saves man power and fuel. One man with a Whitcomb Locomotive hauls many loads at a time. That means extra profit per load, but multiply it by the many extra years of service a Whitcomb will give, and you have an amazing story of profit. The superior engineering in Whitcomb Locomotives assures long life and low upkeep.

In mine, quarry and construction work, in every corner of the Globe, over rough, temporary track, for half a century, Whitcomb Locomotives have proved their worth. Their improvement has kept pace with the advancement in internal combustion engineering. New methods have also simplified the shifting of tracks.

Without obligation, our engineers will survey your haulage requirements and estimate the savings you can expect from Whitcomb equipment.

A Size and Type to Suit Your Needs

Gasoline or Diesel Mechanical Drive
Gasoline or Diesel Electric Drive
Electric Storage Battery
Electric Trolley

THE WHITCOMB LOCOMOTIVE COMPANY

Plant at Rochelle, Illinois

Subsidiary of The Baldwin Locomotive Works, Paschall Station Post Office, Philadelphia, Pennsylvania.

WEAR COSTS DELAY REPAIRS RESISTANCE FRICTION

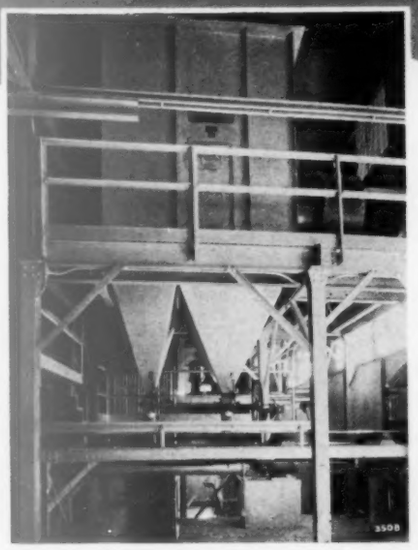
Dust Control is ECONOMY

—SLY INCREASES PROFITS by Eliminating Production Losses

● Smooth running, uninterrupted plant production cannot be attained when men and machines are forced to operate against the hazard of dust. The very existence of dust is costly.

Increase your plant profits by eliminating dust resistance in plant operations. It is being done successfully by leading cement and rock crushing plants everywhere.

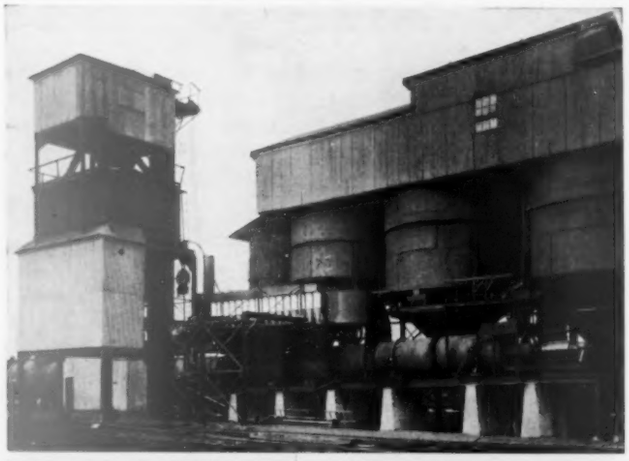
A Sly sales engineer has more facts that will apply to your individual problem. Write us for his story.



● Sly Flat Cloth bag filter installed in cement plant.

SLY

THE W. W. SLY MFG. CO.
CLEVELAND, OHIO



WARREN ASPHALT PLANTS
HOT MIX —— COLD MIX
—— OR ——
COMBINATION UNIT FOR BOTH TYPES
CAPACITY DESIGN AND ARRANGEMENT TO MEET ANY REQUIREMENTS

Designed and Built
—— By ——
WARREN BROTHERS ROADS CO.
P. O. BOX 1869
Boston Massachusetts

Check in at DeWITT OPERATED HOTELS

In CLEVELAND it's The HOLLENDEN

In COLUMBUS it's The NEIL HOUSE

In AKRON it's The MAYFLOWER

In TOLEDO it's The NEW SECOR

In JAMESTOWN (New York) it's The JAMESTOWN and The SAMUELS

and featuring

Unusually Comfortable, Modern Rooms; Good Food, Carefully Prepared and Served; Every Modern Hotel Facility and Reasonable and Uniform Rates

"Genuinely Friendly"

ALLIGATOR

TRADE MARK REG. U.S. PAT. OFFICE

STEEL BELT LACING

The smooth, durable hinged joint of Alligator Steel Belt Lacing is the most universally used of all belt lacings. Clinched teeth compress belt ends firmly, reducing destructive internal friction and ply separation. Twelve sizes in steel, "Monel Metal," and alloys for belts up to 5/8 in. Standard boxes, "Handy Packages," and long lengths.

Sold at wholesale and retail throughout the world.

Sole Manufacturers

FLEXIBLE STEEL LACING CO.

4623 Lexington Street, Chicago

REG. U. S. PAT. OFFICE

Put LINK-BELT Experience into your Screen Installation

● Profit by the ideas gained from thousands of practical cost-cutting installations handling all kinds of materials, such as sand, gravel, crushed stone, coal, coke, clay, fertilizer, lime, ores, grain, sugar, chemicals, pulpwood chips, etc.

Submit your screening problems to Link-Belt. Send for Catalog No. 1562.

●

Link-Belt Company, Philadelphia, Chicago, Indianapolis, Atlanta, San Francisco, or any of our other offices, located in principal cities.

7300

LINK-BELT *Vibrating* SCREENS

Above is a Sauerman Slackline moving gravel from deep under water to top of screening plant. Below is drag scraper stockpiling surplus output of another plant.

DIG AND HAUL FOR FEW CENTS PER CUBIC YARD

Wherever there is a problem of excavating sand and gravel, stripping overburden, stockpiling bulk materials, or other work involving hauls of any distance from 100 to 1500 ft.—it pays to find out what a Sauerman Slackline or Drag Scraper will do and what it will cost. In most cases a Sauerman machine shows a saving in comparison with any other equipment that will dig and haul an equal yardage.

Tell us about your problem and we will offer our suggestions on equipment for your consideration. Catalog illustrating several hundred typical installations mailed free on request.

SAUERMAN BROS.

434 S. Clinton St. CHICAGO

HERE'S A BOOK ABOUT DUST

A fascinating description of various types of equipment for collecting anything that floats in gas—dust, fog, fume, mist. A picture book that shows how millions of tons of dust from smelters, crushers, boilers, kilns, etc., have been collected in the past quarter century—how acid mist and potash fumes have been prevented from damaging property. The book is

FREE

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1016 West 9th St., Los Angeles, California ● New York, N. Y.

COTTRELL PRECIPITATORS . . . MULTICLONES . . . SPRAY DRYERS

PIONEER IN DUST AND FUME CONTROL

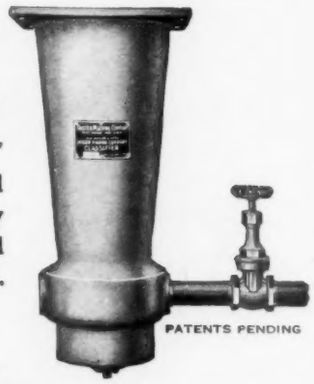
- **strength** in abundance, in excess of its ultimate requirements, fits the Won Way Body for shovel and quarry abuse . . . its rigidity remains pronounced over years of constant use.
- **symmetry** that expresses harmonious relationship to the truck proper . . . that lends appeal from the visual as well as the practical point of view.
- **stamina** in the Won Way Body is most evident in the details of its design . . . its Herculean structure assures lasting endurance.

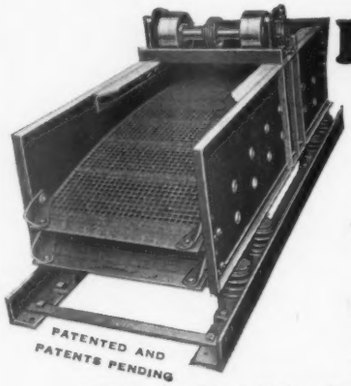
EASTON CAR & CONSTRUCTION COMPANY, EASTON, PA.

COMPOUND FUNNEL CLASSIFIER

For sizing minus 5/16" gravel and sand, and for cleaning it by washing out silt and other light impurities.

Descriptive Bulletin No. 23





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Improved Heavy Duty

VIBRATING SCREEN

Built in all standard sizes—in from one to three decks.

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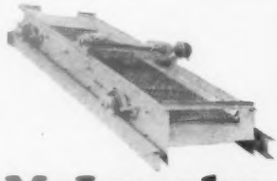
DEISTER MACHINE COMPANY

1933 EAST WAYNE STREET FT. WAYNE, IND.



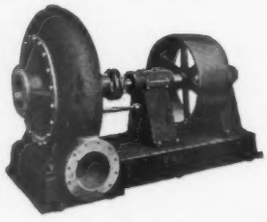
McLanahan Equipment

Single and double roll and jaw crushers, hammer mills, super dry pans,—steel log washers and scrubbers, sand drags, revolving and vibrating screens, elevators, conveyors, dryers, jigs, hoists,—complete portable, semi-portable and stationary crushing, screening and washing plants for different capacities of any materials.

McLanahan & Stone Corporation

Continuously in Business Since 1835

Hollidaysburg, Pennsylvania



Foremost for 45 years

ERIE Dredge Pumps

100% Pump Performance

achieved by the use of superwear alloy steel and the rugged construction of every detail part. Write for Bulletin.

ERIE PUMP & ENGINE WORKS

153 GLENWOOD AVENUE MEDINA, NEW YORK

ROUND
SQUARE
SQUAROUND*
HEXAGON
PERFORATED PLATE
of every description
for maximum productiveness from your vibrating screens.
*Reg. U.S.Pat. Off.

HENDRICK MANUFACTURING CO.

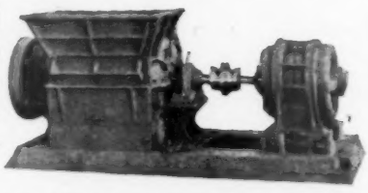
39 Dundaff Street, Carbondale, Pa.

Sales Offices in Principal Cities. Please Consult Telephone Directory

AMERICAN CRUSHERS

for Greater Tonnage at Lower Cost

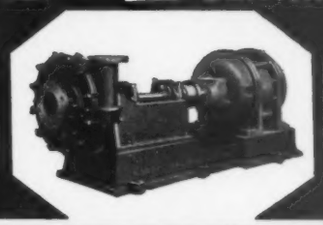
Hammermill and Ring Mills built in many sizes for numerous requirements. Tell us your reduction problems.



AMERICAN PULVERIZER COMPANY

1289 MACKLIND AVE. ST. LOUIS, MO.

MORRIS
CENTRIFUGAL PUMPS



For handling abrasive materials, corrosive liquids, or clear water. Special designs and materials for each service to provide long life, maintenance of initial high efficiency and low upkeep cost.

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Baldwinsville, N. Y.

MORRIS MACHINE WORKS • BALDWINSVILLE, N.Y.

PULVERIZERS

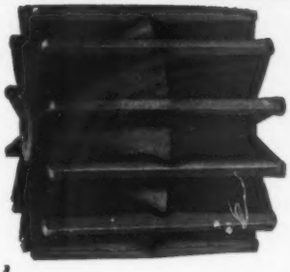
Capacities---1 to 50 Tons per hr.
Finenesses---20 to 350 Mesh.

Air Classifiers

Sizes for any desired capacity.

The MODERN **AIR SEPARATOR**

BRADLEY PULVERIZER CO.
ALLENTOWN, PENNA.



CONVEYORS LAST LONGER

where SPROUT-WALDRON Wing Pulleys are used. The same is true of your Elevator belts.

Material conveyed cannot lodge between belt and pulley to cut your belts.

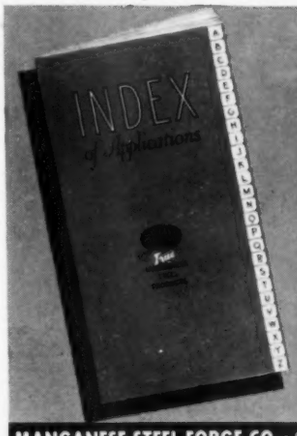
Interchangeable with standard pulleys.

Write for catalog

SPROUT, WALDRON & CO., INC.

1221 SHERMAN ST., MUNCY, PA.

Elevating, Conveying and Transmission Equipment



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Rol-Man Rolled, True (11% to 14%) Manganese Steel has practically double the strength and abrasion resistance of cast manganese steel, ten times the "effective strength" of mild steel and three and a half times that of heat treated nickel steel. Send for this 32 page catalog No. 3R. No obligation.

MANGANESE STEEL FORGE CO. • Castor Ave. & Allen St. • PHILADELPHIA

CONVEYING SYSTEMS FOR PULVERIZED, FINE, CRUSHED & GRANULAR MATERIALS

FULLER-KINYON—FLUXO—AIRVEYOR

ROTARY FEEDERS - DISCHARGE GATES

FULLER ROTARY COMPRESSORS AND VACUUM PUMPS

AUTOMATIC BATCH WEIGHERS
BIN SIGNALS

FULLER COMPANY

CATASAUQUA, PENNSYLVANIA

Chicago: Marquette Bldg. San Francisco: Chancery Bldg.

LOW COST CRUSHING FOR 52 YEARS

"One Reduction"
Roller Bearing
JAW CRUSHERS

Saves 10% to 15% in Fuel
90% in Lubrication

Tremendous Crushing Power—Larger Capacity—more Uniform Product—complete Safety—to meet any Rock or Gravel Crushing Problem.

"Established 1885"

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CRUSHERS - PULVERIZERS - GRINDERS

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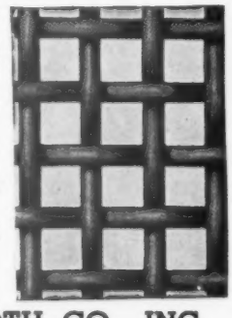
GRUENDLER CRUSHER & PULVERIZER CO.
2915-21 N. Market St., Dept. P.Q., St. Louis, Mo.

FIVE STAR FEATURES

of Nat-aloy Wire Cloth



- ★ Wears five to ten times as long as cloth made of ordinary steel
- ★ Withstands vibration without crystallization
- ★ Super-tough to resist abrasion
- ★ Maintains accuracy throughout life of screen
- ★ Economical in price and serviceability

Attractive Prices
Immediate Shipments from Stock

NATIONAL WIRE CLOTH CO., INC.

St. Paul, Minn. Write for new catalog No. 36.

RECLAIM . . . .

Jaw Plates, Gyratory and Roll Crushers, Shovel Teeth, Etc.

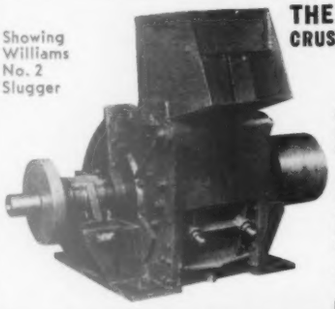
with

MANGANAL

11 to 13½% Nickel Manganese Steel

WELDING ELECTRODES, WEDGE and APPLICATOR BARS

STULZ-SICKLES CO. *Sole Producers* 134-142 Lafayette St., Newark, N. J.


Showing Williams No. 2 Slugger

THE WILLIAMS "SLUGGER"
CRUSHER *for* MAKING 1¼", ¾" OR AGSTONE
HANDLES LARGE STONE

Rows of heavy, free swinging, fast revolving hammers, crush the material by impact until of proper size to pass through the gates. By reducing large rock to 1¼", ¾" or agricultural size in one operation, the "Slugger" has enabled operators to produce these sizes at a very low cost per ton and with small investment.

WILLIAMS PATENT CRUSHER AND PULVERIZER COMPANY
802 St. Louis Ave. - St. Louis, Mo.

WILLIAMS
PATENT CRUSHERS GRINDERS SHREDDERS

Screening
Efficiency
Consistently
Obtained

with SECO VIBRATING SCREENS

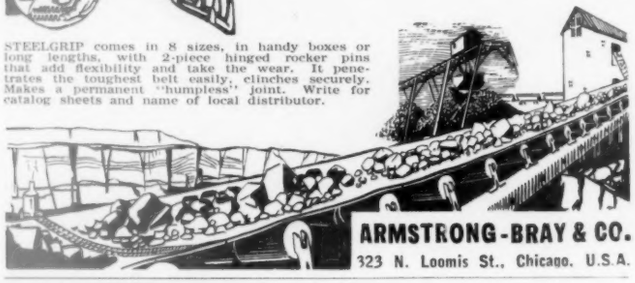
SCREEN EQUIPMENT CO.
9 LAFAYETTE AVE., BUFFALO, N. Y.

STEELGRIP

FOR HEAVY "OUTDOOR" DRIVES

As manufacturers of both types of flexible belt lacing, we recommend STEELGRIP for heavy drives, conveyor belts and outdoor jobs for: (1st) It can be applied anywhere—all you need is a hammer. (2nd) It compresses and protects belt ends—prevents fraying, adds to belt life. It is flexible and easily detachable. (3rd) It stands corrosion and erosion better than the lighter belt hooks.

STEELGRIP comes in 8 sizes, in handy boxes or long lengths, with 2-piece hinged rocker pins that add flexibility and take the wear. It penetrates the toughest belt easily, clinches securely. Makes a permanent "humpless" joint. Write for catalog sheets and name of local distributor.



ARMSTRONG-BRAY & CO.
323 N. Loomis St., Chicago, U.S.A.

LIGHTNING

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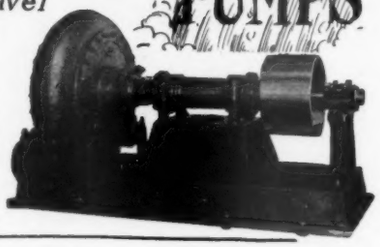
PUMPS



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3—Jaw crushers: 1—12x26″ Champion No. 6; 1—10x20″ Climax No. 2½; 1—9x16″ Telsmith No. 9-A.
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21 ton Vulcan 4-wheel saddle tank locomotive, 36″ gauge.
5-yard Western 2-way side dump cars, 36″ gauge.
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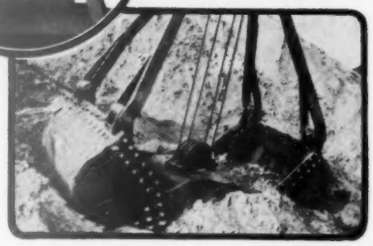

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